OS 102

Bulletin of the British Ornithologists' Club

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MEETINGS are open to **all**, not just BOC members. There is **no charge** to attend the talk but it is necessary to register at least one day in advance of the meeting. Meetings are usually held on the ground floor of the Sherfield Building of **Imperial College**, South Kensington, London SW7 2AZ. The suite is called the **Tower Rooms** and meetings take place in **Section A** with the entrance opposite the Queen's Tower in the main quadrangle. The nearest Tube station is at South Kensington. For maps, see: http://www3.imperial.ac.uk/campusinfo/southkensington. (Limited car parking facilities can be reserved at a special reduced charge of **£5.00**, on prior application to the Chairman.)

The evening will commence with a talk at 6.00 pm. Thereafter the cash bar will open so that attendees can socialise. At *c.*7.30 pm there will be a light buffet supper (sandwiches etc.) costing **£15 per person** for those who have ordered it at least two weeks in advance. Vegetarian and gluten-free options will be available for those who have requested them when booking.

FORTHCOMING MEETINGS

See also BOC website: **http://www.boc-online.org**

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14 June 5.40 pm—Annual General Meeting in room SALC3 on 5th floor of Sherfield Building

6.00 pm—Short talks in Section A of the Tower Rooms (see above)

Nigel Redman—*What is Sharpe's Lark?* and *Species, races or morphs: taxonomic confusion in the Tropical Bonbon complex*

Clive Mann—*Two tropical cuckoo problems*

David Fisher—*TBC*

Douglas Russell—*Con artist or unfairly maligned collector—the rediscovery of William Farren's Black Woodpecker eggs from the New Forest*

Robert Prŷs-Jones—*Type specimens of the Imperial Woodpecker: confusion resolved?*

Anyone wishing to place a late order for the buffet supper should contact the Chairman (address below) no later than **Thursday 9 June 2011**

To comply with Imperial College requirements, those wishing to attend the talks must notify the Chairman no later than **Monday 13 June 2011**

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11 October—Rachel Bristol—*Back from the brink: translocations of threatened endemic birds in the Seychelles*

Abstract: Following initial failures in the 1970s, translocations (reintroductions and conservation introductions) of threatened endemic birds have more recently had great success in increasing the numbers, range and conservation status of five of the eight Seychelles threatened endemic bird species. Methods have been refined with time and trial and, although still learning, we now have consistent translocation success. Keys to success in Seychelles have been: ensuring all of the species' habitat requirements are provided in the new environment (e.g., habitat rehabilitation prior to release, predator management, provision of nest boxes), translocating only wild birds, and tailoring the release methods to the species.

Biography: Rachel Bristol has worked for the last 20 years to conserve threatened endemic birds in New Zealand, Hawaii, Mauritius and, for the past 14 years, the Seychelles, where she has led several avian conservation introductions. She is currently undertaking a Ph.D. in the ecology, conservation genetics and restoration of the Seychelles Paradise Flycatcher *Terpsiphone corvina*, and a comparison of the evolutionary history of Indian Ocean flycatchers, at the Durrell Institute of Conservation and Ecology, University of Kent.

Those wishing to order the buffet supper should apply to the Chairman (address below) by **27 September 2011**

To comply with Imperial College requirements, those wishing to attend the talk must notify the Chairman no later than **Monday 10 October 2011**

Saturday 29 October 2011—*please note change of date*—Birds of South and Middle America—recent advances in knowledge. ***Please see Club Announcements, opposite, for details of this one-day symposium to be held at the Natural History Museum.***

The Chairman: Helen Baker, 60 Townfield, Rickmansworth, Herts. WD3 7DD UK. Tel. +44 (0)1923 772441. E-mail: helen.baker60@tiscali.co.uk

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Bulletin of the
BRITISH ORNITHOLOGISTS' CLUB

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CLUB ANNOUNCEMENTS

Chairman's message

Please note that, in order to book the speakers we wanted, it has been necessary to bring forward the joint meeting with the Neotropical Bird Club and the Natural History Museum to Saturday 29 October 2011. The provisional programme is given below.

Full details will be made available at www.boc-online.org and www.neotropicalbirdclub.org/ from 1 July.

Helen Baker

Birds of South and Middle America—recent advances in knowledge

Joint British Ornithologists' Club / Neotropical Bird Club / Natural History Museum one-day symposium, 29 October 2011 at the Flett Theatre, Natural History Museum, London SW7 5BD

10.30–11.00 Coffee / tea

11.00–11.45 ***Why birds sing at dawn*** Nathalie Seddon (Edward Grey Institute, Oxford University)
Communal displays of acoustically and visually signalling animals include some of the great spectacles of the living world. Many of these spectacles involve large communities of different species signalling in concert, often just before sunrise. Though perhaps best documented in birds, dawn choruses occur in a wide diversity of other animals, from primates and frogs, to lizards and insects. These signalling events have long fascinated humans, but despite a century of speculation, there is little consensus as to their adaptive significance. Drawing on a recent study of the largest dawn chorus of all, that of the singing birds of upper Amazonia, I will discuss how ecology, social interactions and evolutionary history drive birds to synchronise their songs at daybreak.

11.45–12.30 ***Conservation of high-Andean forest birds in Peru*** Huw Lloyd (Manchester Metropolitan University)
The loss and degradation of high-Andean *Polylepis* woodland is of particular international concern because of its highly fragmented distribution, the inadequacy of its protection within national reserves, and the high levels of habitat-restricted endemism among its threatened bird communities. I will discuss some of the recent ornithological findings from southern Peru, which could lead to the development of realistic habitat restoration strategies for populations of these severely threatened bird species.

12.30–13.15 ***Wildlife of the Pantanal, South America's Serengeti*** James Lowen (Bradt Travel Guides)
The world's largest wetland and the aquatic heart of South America showcases some of the most breathtaking gatherings of birds, mammals and reptiles you could ever hope to see. The author of a recently published book to Pantanal wildlife and travel treats us to a visual celebration of the region's wildlife spectacles, with a particular focus on its avian specialities and their conservation.

13.15–14.15 Lunch

14.15–15.00 ***The Mexican Bird Atlas : a collaborative approach for the study of biodiversity*** Adolfo Navarro (Universidad Nacional Autónoma de México)
Bird specimens and their associated data are essential tools in the study of many biological disciplines. I will present an overview of an effort lasting almost 20 years to compile information on Mexican bird specimens in natural history museums worldwide, and the diverse ways in which this 'Atlas' project has helped advance ornithological knowledge in such diverse areas as taxonomy, biogeography, conservation biology and biodiversity informatics.

15.00–15.45 ***Project BioMap: documenting the global museum resource of Colombian birds for research and conservation*** Robert Prŷs-Jones (Natural History Museum)
Project BioMap, a tri-national initiative between British, Colombian and US institutions, began in late 2001. The project aim was to digitise and verify all Colombian bird specimens deposited in natural history museums around the world. A total of 217,802 Colombian bird specimens in 88 museums were databased and georeferenced (whenever possible) and made available online (http://biomap.net). I will present a temporal and spatial breakdown of the information available, highlighting strengths and weaknesses, and discuss its use in research and conservation.

15.45–16.15 Coffee / tea

16.15–17.00 ***Exploring, studying and protecting the world's most diverse national avifauna*** Thomas Donegan (ProAves)

The publication in 2010 of a new field guide for Colombia offers a good point to take stock of recent advances in knowledge in the world's most diverse country for birds. Explorations and discoveries facilitated by the improving security situation and the increasing capacity of national researchers and institutions have resulted in significant recent findings (new species, splits, lumps, new records, etc.), many of which will be discussed. An illustrated discussion of some of the steps being taken to conserve Colombia's birds and their habitats will also be presented.

The 961st meeting of the Club was held on Tuesday 27 April 2010 in the Sherfield Building, Imperial College, South Kensington, London SW7 2AZ. Eighteen members and seven guests were present.

Members attending were: Miss H. BAKER (*Chairman*), D. R. CALDER, Cdr. M. B. CASEMENT, RN, Prof. R. A. CHEKE, D. J. FISHER, F. M. GAUNTLETT, D. GRIFFIN, K. HERON JONES, R. H. KETTLE, R. R. LANGLEY, D. J. MONTIER, R. C. PRICE, Dr R. P. PRŶS-JONES, P. J. SELLAR, S. A. H. STATHAM, C. W. R. STOREY, M. J. WALTON and P. J. WILKINSON.

Guests attending were: Mrs M. H. GAUNTLETT, Mrs J. HERON JONES, J. LOWEN, Mrs M. MONTIER, Mrs A. J. McDONALD, Mrs H. PRICE and E. PRICE.

After dinner a series of short talks was given. Prof. Robert A. Cheke spoke on *An indigenous trap for mass capture of Red-billed Quelea*. He described a basket trap that he was shown by Richard N. Magoma, James Mabuga and Boaz Mtobesya of the Tanzanian Ministry of Agriculture, Food Security and Co-operatives, which is used by bird trappers in the Kondoa area of Tanzania to catch Red-billed Quelea *Quelea quelea aethiopica* in the dry season. The traps are woven from African Star Grass *Cynodon nlemfluensis* into torus-shaped structures, resembling a wheel, *c.*60 cm in diameter, 20 cm deep and 2 m in circumference, with central holes that serve as entrances for birds. The hole on one side (15 cm) is larger than on the other (10 cm), with the latter tapered inwards. Two methods are used: one in water and one on land, with a decoy bird inside from the outset in both. When trapping at drinking sites, the basket is partially submerged with the large hole uppermost, and grasses then conceal much of the basket. Birds lured into the entrance to drink become trapped. Similarly, when used on land, the basket is baited with a panicle of bulrush millet or millet seeds, and placed in a feeding zone with the smaller hole uppermost and the larger hole underneath blocked. A trapper deploys 5–10 traps from which 500–1,000 birds can be caught per day. Any surplus to the trappers' requirements are sold, providing much-needed income for the trappers and protein for the buyers. Different ways in which the birds are cooked were described and the results of experiments by B. Mtobesya using similar traps made of wire mesh discussed as a means of localised pest control, with care taken to release any non-target birds caught.

Dr Robert Prŷs-Jones' talk was entitled *The case of the Large-billed Reed Warbler: museum collections shed light on an unknown species*. Following its description in 1867, from a specimen taken in north-west India, the Large-billed Reed Warbler *Acrocephalus orinus* led a twilight existence for 135 years, with no further specimens discovered and an increasing tendency to consider it either an unusual specimen of a known species or a hybrid. However, in 2002 a re-analysis that included a molecular study demonstrated that it was a distinct species, and in 2006 a live bird was discovered in Thailand. Subsequent intensive museum study turned up sufficient overlooked specimens to provide an overview of its annual cycle, suggesting that it bred in south-central Asia, migrated across India and wintered in south-east Asia. Breeding in north-east Afghanistan and Tajikistan has now been confirmed. More detail, including references, can be found at http://www.nhm.ac.uk/nature-online/species-of-the-day/collections/our-collections/acrocephalus-orinus/index.html.

David Fisher showed photographs of hummingbirds taken on three-week trips to Ecuador in 2009 and Mexico in 2010. In Ecuador he had seen 58 species and photographed 34 of them reasonably well, in Mexico he had seen 26 species but only managed to photograph three. He explained that this was due to the different views in the two countries concerning hummingbird feeders. In Ecuador they are commonplace at every lodge, whereas in Mexico they simply don't exist. David had been informed that there are no feeders in Mexico because several years ago an influential biologist suggested that they might be harmful to hummingbirds, and this view spread rapidly with the result that feeders are not used at all—which is quite remarkable given how common they are in the USA, Costa Rica, Ecuador and other countries. David explained that at Umbrellabird Lodge, run by the Jocotoco Foundation, feeding has reached a new level, with large salad trays being used rather than commercial flower-like feeders. These attract dozens of hummingbirds at a time, and 200–300 individuals of ten species were simultaneously present on the lodge veranda or waiting in the surrounding bushes. He showed photographs of each of the species present.

Martin Gauntlett addressed the question *How many species of extant birds are there?* The first edition of Howard & Moore appeared in 1980 and listed 8,984 species. At the time, Pink-footed Goose *Anser brachyrhynchus* was still considered a subspecies of Bean Goose *A. fabalis*. Ten years later, when Sibley & Monroe put the DNA cat among the taxonomic pigeons, the number had grown to 9,598. BirdLife International takes its own line on species-level splits and its June 2009 posting listed 9,803, plus 126

under review. Many of the latter will probably be accepted. Clements follows the AOU. Its 6.4 version in December 2009 listed 9,888 species. The third edition of Howard & Moore appeared in 2003 and took a rather conservative approach, requiring peer-reviewed literature to accept a change, and listed 9,593 species. Now there is *HBW*, which is likely to total 9,692 species. Its earlier volumes were more conservative and a taxonomic round-up at the end of the series is anticipated. Comparing their lists, the four 21st century sources agree on just 9,359 species (assuming *HBW* agrees for all species treated in forthcoming volumes) but between them they cover 10,172 species, a difference of 813. Finally, there is the IOC English names committee. In December 2009 it listed 10,366 species. In March 2010 this had increased 10,384, an additional 18 species in three months. Thus, the answer to the question is that (in April 2010) there were between 9,351 and nearly 10,500 extant species, and the list was growing by six species per month.

In pursuit of a dream to observe Steller's Sea Eagles *Haliaeetus pelagicus* on the sea-ice off Hokkaido, Richard Price, and his wife Helen, travelled to Japan in February 2009. In addition to realising his dream, with the Steller's jousting with White-tailed Eagles *Haliaeetus albicilla*, they also saw Japanese (Red-crowned) Cranes *Grus japonensis* dancing in the snow. A bonus was a detour on the way to Hokkaido via Kyushu, the southernmost large island in Japan. Here they saw up to 10,000 Hooded Cranes *G. monacha* and White-naped Cranes *G. vipio*, together with small numbers of Sandhill Cranes *G canadensis* and European Cranes *G. grus*, and two Siberian White Cranes *G. leucogeranus*.

The 965th meeting of the Club was held on Tuesday 29 March 2011 in the Sherfield Building, Imperial College, South Kensington, London SW7 2AZ. Thirteen members and nine non-members were present.

Members attending were: Miss H. BAKER (*Chairman*), Cdr. M. B. CASEMENT, RN, S. E. CHAPMAN, D. J. FISHER, A. GIBBS, K. HERON JONES, C. F. MANN, D. J. MONTIER, R. C. PRICE, Dr R. P. PRŶS-JONES, N. J. REDMAN, S. A. H. STATHAM and C. W. R. STOREY.

Non-members attending were: Mrs C. R. CASEMENT, Ms P. ESTLER, Mrs B. HAMMOND-GIBBS, Mrs J. HERON JONES, G. JAMIE, Mrs M. MONTIER, P. RUDGE, Dr J. TOBIAS (*Speaker*) and Dr T. TOEPFER.

Joe Tobias spoke about the Neotropical ornithology research programme he is currently developing at the Edward Grey Institute in the Zoology Department at Oxford University. He commenced with a quick 'tour' to depict a representative sample of Amazonian bird diversity, including endemic families such as trumpeters (Psophiidae) and Hoatzin *Opisthocomus hoazin* (Opisthocomidae), and other key components of Neotropical avian communities such as guans (Cracidae), motmots (Momotidae), toucans (Ramphastidae) and jacamars (Galbulidae). He then reviewed current efforts to understand the ecology and behaviour of Amazonian birds, and to explain Amazonian diversity, which ranks as the highest in the world in terms of the number of species co-existing at single localities. Turning to research on antbirds (Thamnophilidae) he discussed recent findings from field observations and experiments that males and females sing year-round, often in duets, and that the function of male and female songs varies with context, sometimes reflecting cooperation and at other times conflict between the sexes. He also described how strong competition between antbird species has driven convergence in songs in some closely related species-pairs. At a regional scale, recent studies of Amazonian bird ranges provide support for Alfred Russel Wallace's hypothesis that riverine barriers help to explain the divergence of avian lineages in the Amazon basin, and ultimately shape the patterns of diversity found today.

New Associate Editor

The *Hon. Editor* and BOC Committee are pleased to welcome Frank D. Steinheimer to the newly created post of Associate Editor of the Bulletin, commencing with the September 2011 issue. Among his many other duties, Frank is a mainstay of the *Handbook of the birds of the world* project, wherein he has gradually assumed a scientific consultant role, as well as being a member of the Standing Committee on Ornithological Nomenclature, and the head of one of the largest natural history collections, Halle, in his native Germany. His knowledge of ornithological nomenclature and bibliography, in particular, will be of inestimable value to the Bulletin.

Socotra Buzzard *Buteo socotraensis*—an addendum

In Porter & Kirwan (2010: 118) we stated: '...in the Kruckenhauser *et al.* (2004) analysis of morphological and morphometric characters, Socotran and Cape Verdean buzzards grouped with *B. b. rothschildi* of the Azores, presumably as a result of convergent adaptation to dry-country habitats', a view we repeated directly from the paper just mentioned. Kees Hazevoet has pointed out that the Azores present an extremely wet environment and his view is that phylogeny would be a much more logical explanation than convergent adaptation. We also remarked that RFP had never seen Socotra Buzzard hovering. This needs correcting for, during a three-week visit to the island, in February–March 2011 he observed three individuals (two adults and a juvenile) persistently hovering amid a total of 32 sightings. It is noteworthy that he was concentrating on studying the buzzard and that the days he observed birds hovering were especially windy.

Richard Porter & Guy Kirwan

External characters suggest that Long-tailed Manakin *Chiroxiphia linearis* is monotypic

by Guy M. Kirwan

Received 21 February 2010; final revision accepted 10 March 2011

Summary.—Long-tailed Manakin *Chiroxiphia linearis* has long been considered a polytypic species, with *C. l. linearis* in the north of the range (southern Mexico to Guatemala) and *C. l. fastuosa* in the south (from El Salvador to northern Costa Rica). Despite that no biogeographical barriers are known in the central region of the species' range and that monotypy has already been suggested, this treatment has persisted for almost 90 years. A morphological investigation (plumage and mensural data) reported here suggests that *C. linearis* is better treated as a monotypic species.

Long-tailed Manakin *Chiroxiphia linearis* (C. L. Bonaparte, 1838), which ranges from southern Mexico (in eastern Oaxaca and Chiapas) south almost exclusively over the Pacific slope to northern Costa Rica (AOU 1998), is generally considered to be polytypic, with two subspecies recognised by most recent works (Snow 1979, Dickinson 2003, Snow 2004). Despite that Lesson (1842: 174) had already recognised southern populations separately, under the name *Pipra fastuosa* (type locality Nicaragua), the keynote reviews of American birds in the first third of the 20th century, Ridgway (1907) and Hellmayr (1929), both treated *C. linearis* as monotypic. Lesson's diagnosis alone, in fact, contains nothing on which to base recognising more than one taxon within *C. linearis*. However, Bangs & Peters (1928: 397) promulgated that two subspecies should be recognised, based on the length of the central rectrices (shorter in northern populations) and the larger (presumably longer) and relatively broader bill of northern birds, which differences Ridgway (1907) had already noted but had chosen not to recognise nomenclaturally. Subsequently, most authors have been content to subdivide the species into *C. l. linearis* in the north of the range, from southern Mexico to Guatemala, with *C. l. fastuosa* (Lesson, 1842) from El Salvador south to Costa Rica, despite the lack of any obvious geographical 'divide' between the two populations.

Monroe (1968), however, refuted the notion that bill length or width should be considered a valid subspecific character in *C. linearis*, and pointed to extensive overlap in measurements between birds from Oaxaca (Mexico) and Costa Rica in bill sizes. Monroe (1968) also questioned whether the purported difference in tail-feather length was real, noting 'considerable overlap in measurements between Oaxacan and Costa Rican populations'. During work on Pipridae for a forthcoming monograph (Kirwan & Green in press), I re-evaluated Monroe's (1968) recommendation to return the species to monotypy based on material held at The Natural History Museum (NHM), Tring, UK, the Cambridge University Museum of Zoology (CUMZ), Cambridge, UK, the Field Museum of Natural History (FMNH), Chicago, USA, and the Museo Nacional (MNCR), San José, Costa Rica, from across the species' entire range.

For fully adult males held in the four institutions visited, I can find no obvious difference in bill length (or in any other mensural character sampled; see Appendix), whilst in respect of the length of the central rectrices in *C. l. linearis* (124–165 mm, mean = 148.22 mm; n = 19) vs. *C. l. fastuosa* (112–172 mm, mean = 149.33 mm; n = 34), the purported difference also appears insignificant (see Table 1, Fig. 1). Bill width was not sampled as it

TABLE 1
Morphometrics (in mm) of male Long-tailed Manakins *Chiroxiphia l. linearis* and *C. l. fastuosa*. Mean is given, followed by standard deviation and complete range, and comparison t-tests. For measuring protocols see the Appendix.

	N	**Wing length**	**Tail length**	**Bill length**
C. l. fastuosa	25	70.08 ± 1.41	150.6 ± 16.9	11.023 ± 0.542
		(68.0–72.5)	(112.0–182.0)	(10.32–12.01)
C. l. linearis	10	68.55 ± 1.14	146.8 ± 14.3	11.415 ± 0.635
		(67.0–70.0)	(124.0–165.0)	(10.61–12.43)
Comparison t-test		*P*=0.005	NS	NS

NS = not significant, the null hypothesis of equal means could not be rejected.

	PCA loadings		
Variable	PC 1	PC 2	PC 3
Wing	-0.7089	0.6767	-0.1989
Tail	-0.7051	0.6877	0.173
Bill	0.01966	-0.2629	-0.9646
Variance explained	1.30705	0.714897	0.399954
% of variance	53.968	29.518	16.514

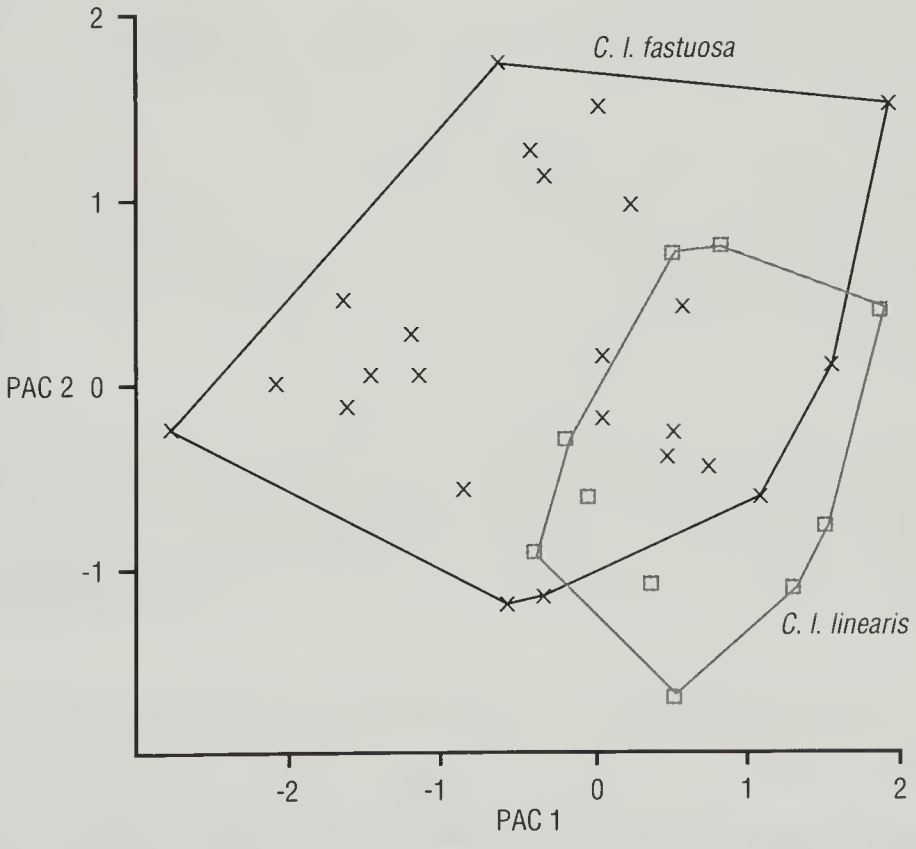

Figure 1. Scatter plot diagram of first (PC1) and second (PC2) principal components for a Principal Components Analysis of three morphometric measurements from both described taxa of Long-tailed Manakin *Chiroxiphia linearis*.

is a relatively difficult character to sample consistently and accurately; furthermore, even using a distinctly less rigorous application of the Biological Species Concept than favoured by this author, it would be somewhat marginal to uphold a taxonomic unit on the basis

TABLE 2
Morphometrics (in mm) of male Long-tailed Manakins *Chiroxiphia l. linearis* and *C. l. fastuosa*, with specimens from El Salvador excluded (see text). Mean is given, followed by standard deviation and complete range, and comparison t-tests. For measuring protocols see the Appendix.

	N	**Wing length**	**Tail length**	**Bill length**
C. l. fastuosa	19	70.34 ± 1.44	151.1 ± 17.9	10.963 ± 0.533
		(68.0–72.5)	(112.0–182.0)	(10.32–11.70)
C. l. linearis	10	68.55 ± 1.14	146.8 ± 14.3	11.415 ± 0.635
		(67.0–70.0)	(124.0–165.0)	(10.61–12.43)
Comparison t-test		*P*=0.002	NS	NS

NS = not significant, the null hypothesis of equal means could not be rejected.

PCA loadings

Variable	PC 1	PC 2	PC 3
Variable	PC 1	PC 2	PC 3
Wing	-0.7056	0.6962	-0.1321
Tail	-0.7084	-0.6885	0.1552
Bill	-0.0171	-0.2031	-0.979
Variance explained	1.28704	0.728131	0.362004
% of variance	54.142	30.63	15.228

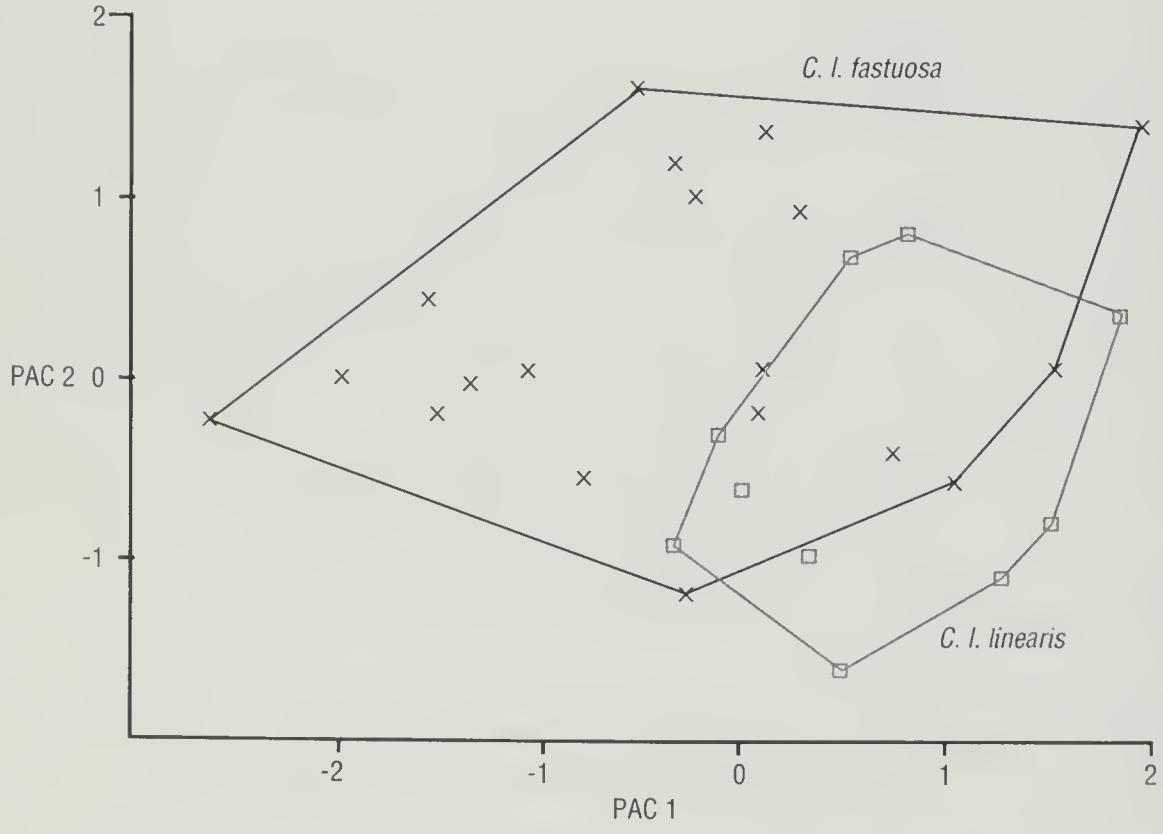

Figure 2. Scatter plot diagram of first (PC1) and second (PC2) principal components for a Principal Components Analysis of three morphometric measurements from both described taxa of Long-tailed Manakin *Chiroxiphia linearis*; specimens from El Salvador are excluded from this analysis.

of so minor a character. (Specimens of *C. l. linearis* are from Mexico and Guatemala, and specimens of *C. l. fastuosa* are from El Salvador, Nicaragua and Costa Rica; measuring protocols are described in the Appendix.) A random subset of 35 males held at FMNH was subjected to a morphometric analysis and Principal Components Analysis, which revealed no significant variation between males of the two subspecies in tail (central rectrices) or bill

lengths (Table 1, Fig. 1). Because the El Salvador specimens (six included within the FMNH subset) might be construed to represent a transition zone between the two 'populations', their localities were investigated. The six males pertain to the following localities: Parque Nacional El Imposible, Ahuachapán (n = 1), Laguna Olomega, San Miguel (n = 2), Puerto del Triunfo, Usulután (n = 1) and Los Blancos, north-east of San Miguel (n = 2). The first-named locality is in western El Salvador, whereas the other three are all in the eastern third of the country, which might be considered less likely to be sited within a transition zone between the two subspecies. Again, no significant variation between males of the two subspecies was found in tail (central rectrices) or bill lengths (Table 2, Fig. 2). In both cases, variation in wing length was uncovered, but was not highly significant.

It is worth remarking that an additional factor that needs to be considered in attempting to divine geographic variation in tail length is that this character apparently decreases with age once males have achieved fully adult plumage (Arévalo & Heeb 2005), which could easily 'cloud' efforts to distinguish inter-populational differences.

C. l. fastuosa has, more recently, also been stated to differ from *C. l. linearis* in being overall brighter, with the red hindcrown feathers forming a short crest (Snow 2004), which my examination of the material at the four museums visited again suggests is impossible to validate. I can recognise no evidence of overall (consistent) differences in coloration between northern and southern populations, or that males in the south of the species' range possess a greater tendency to show a crest-like effect on the hindcrown. And, no other author (of which four, Ridgway, Hellmayr, Bangs & Peters, and Monroe, might have been expected to notice them) has suggested that such characters may be used to delimit two races in *C. linearis*.

Whether molecular data might yet shed fresh light on this manakin's taxonomy must remain an open question for now, but McDonald (2003) already uncovered evidence for asymmetric gene flow between two nominally disjunct populations of Long-tailed Manakins in north-west Costa Rica. For now, I postulate that the available (morphological) evidence favours returning *C. linearis* to monotypy just as Burt Monroe recommended over 40 years ago.

Acknowledgements

I thank Mark Adams and Robert Prŷs-Jones for their tireless assistance at The Natural History Museum, Tring. For similar courtesies I am grateful to Ghisselle Alvarado and Silvia Elena Bolaños at the Museo Nacional de Costa Rica, San José, Costa Rica, Michael Brooke at the Cambridge University Museum of Zoology, and David Willard, Mary Hennen and John Bates at the Field Museum of Natural History. Finally, but certainly not least, I thank my referees, David Anderson and Oliver Komar, for their valuable contributions to the manuscript.

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Appendix: mensural data for *Chiroxiphia linearis*.

Measurements were taken using a metal wing rule and digital callipers, and for males were based on fully adult-plumaged birds with apparently full central rectrices (for which see the text); here, tail refers to the length of the main tail, not the central rectrices. Value ranges are complete. A random subset of 35 males held at the Field Museum of Natural History (FMNH) was subjected to a morphometric analysis using three characters (see Table 1, Fig. 1). Mean values are rounded up or down to the nearest 0.1 mm or 0.01 mm. For other museum acronyms see main text.

Chiroxiphia l. linearis (BMNH; CUMZ; FMNH: Mexico and Guatemala): wing of male (n = 20) 67–74 mm (mean = 68.6 mm), wing of female (n = 6) 68–72 mm (mean = 69.5 mm); tail of male (n = 12) 27–35 mm (mean = 32.7 mm), tail of female (n = 6) 30.5–36.0 mm (mean = 33.6 mm); bill of male (n = 20) 10.56–12.43 mm (mean = 11.41 mm), bill of female (n = 5) 11.47–12.44 mm (mean = 11.82 mm); tarsus of male (n = 12) 17.78–19.67 mm (mean = 18.67 mm), tarsus of female (n = 6) 15.91–18.36 mm (mean = 17.34 mm).

Chiroxiphia l. fastuosa (BMNH; CUMZ; FMNH; MNCR: Costa Rica, El Salvador and Nicaragua): wing of male (n = 37) 68–74 mm (mean = 70.1 mm), wing of female (n = 6) 62.5–72.0 mm (mean = 67.4 mm); tail of male (n = 13) 29–34 mm (mean = 32.1 mm), tail of female (n = 6) 30.5–37.0 mm (mean = 34.0 mm); bill of male (n = 37) 10.04–12.01 mm (mean = 10.94 mm), bill of female (n = 8) 10.75–11.80 mm (mean = 11.39 mm); tarsus of male (n = 12) 16.48–19.14 mm (mean = 18.04 mm), tarsus of female (n = 6) 16.84–18.18 mm (mean = 17.35 mm).

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Taxonomy of the Pacific Swift *Apus pacificus* Latham, 1802, complex

by Paul J. Leader

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Summary.—This paper considers the taxonomic implications of morphological differences within the Pacific Swift *Apus pacificus* complex. Specimens of the four currently recognised subspecies (nominate, *kanoi*, *cooki* and *leuconyx*) were examined, plus *kurodae* (currently treated as a synonym of *pacificus*) and *salimali* (currently treated as a synonym of *kanoi*). Consistent plumage and structural differences indicate that the current taxonomy of the complex is untenable. It is proposed that *salimali* is a valid taxon but that *kanoi* is not (and should be treated as a junior synonym of *kurodae*) and that *pacificus*, *salimali*, *leuconyx* and *cooki* merit species status.

Pacific Swift *Apus pacificus* is widely distributed, breeding from Siberia east to Kamchatka and Japan, south through China to Vietnam, Thailand and Myanmar, and Tibet, the outer Himalayas and Assam Hills (Chantler 1999). Four subspecies are generally recognised (Chantler & Driessens 1995, Chantler 1999, Dickinson 2003): *A. p. pacificus* Latham, 1802, *A. p. kanoi* Yamashina, 1942, *A. p. cooki* Harington, 1913, and *A. p. leuconyx* Blyth, 1845. This paper reviews structural and plumage differences between these taxa (the '*pacificus* complex') based on an examination of specimen material and considers the taxonomic implications of these differences. Comparison is made with Dark-rumped Swift *A. acuticauda* where relevant.

Material and Methods

A total of 146 *Apus pacificus* specimens was examined at the Natural History Museum, Tring, UK (BMNH), Museum für Naturkunde, Berlin, Germany (ZMB), the Yamashina Institute for Ornithology, Tokyo, Japan (YIO), and the Institute for Zoology, Chinese Academy of Science, Beijing, People's Republic of China (IOZ). These specimens included 44 nominate, 47 *kanoi*, 24 *cooki* and 13 *leuconyx*. Twelve *A. p. kurodae* Domaniewski, 1933, and six *A. p. salimali* Lack, 1958, specimens were also examined. The former is generally treated as a synonym of *pacificus* and *salimali* as a synonym of *kanoi* (Vaurie 1965, Chantler & Driessens 1995, Chantler 1999, Dickinson 2003). The holotypes of *kanoi*, *cooki* and *salimali* were included in my analyses. One specimen of *A. acuticauda* was examined and to supplement this, data and photographs pertaining to 18 *A. acuticauda* specimens were also provided (J. Hinshaw pers. comm.).

The following measurements were taken: wing length (maximum chord), length of the longest and shortest tail feathers measured from the tail base (from which depth of tail fork was calculated) and distance between the tips of the two longest primaries (measured on the closed wing). All measurements were recorded to the nearest 0.5 mm. Plumage differences were assessed in detail, with consideration given to those attributable to age class (adult or juvenile), specimen condition and wear. Primaries are numbered from the outermost (p1) inwards.

Results

Plumage differences.—The key plumage differences proved to be the size of the rump patch, extent of pale fringes on the underparts, the depth and width of the throat patch, the ground colour of the underparts and upperparts, and the colour of the underwing-coverts. I found these to vary between taxa more than is generally indicated in most of the literature (though see Rasmussen & Anderton 2005), and I found consistent plumage differences between most of the taxa examined. These differences are summarised in Table 1.

Structural differences.—I found that size and structure varied between taxa and consider that for most taxa there exist consistent differences from other taxa for one or more of the parameters measured (see Table 2). There was little difference with regard to the distance between the two longest primaries, except in the case of *cooki*, which is discussed below. When combined, structural and plumage differences permitted most taxa examined to be readily differentiated.

Diagnoses.—*A. p. pacificus*: in plumage and structure, *pacificus* is very similar to both *kurodae* and *kanoi* (Figs. 1–4). There is extensive overlap in wing length between these three taxa, although in *pacificus* the tail is longer than in *kurodae* or *kanoi* (mean 75.1 mm for *pacificus* vs. 71.1 mm and 72.4 mm for *kurodae* and *kanoi*, respectively), although values for tail fork depth were similar (mean 32.8 mm for *pacificus* vs. 29.8 mm and 30.4 mm for *kurodae* and *kanoi*, respectively), as was relative depth of the tail fork expressed as a percentage of tail length (mean 43.3% for *pacificus* vs. 42.0% and 41.8% for *kurodae* and *kanoi*, respectively).

Plumage differences from *kurodae* and *kanoi* are limited to a tendency for *pacificus* to exhibit a cleaner, whiter throat patch and a slightly broader rump patch than *kurodae* and *kanoi*, although many *kurodae* and *kanoi* possess a rump patch comparable to that of typical *pacificus*.

Kurodae: for separation from *pacificus*, see that taxon. I found this taxon inseparable in terms of both plumage and structure from *kanoi*, even when comparing the holotype of *kanoi* to a series from Japan (Figs. 3–4) (see Discussion concerning the type locality of *kurodae*).

Kanoi: for separation from *pacificus*, see that taxon. As discussed above, I found *kanoi* and *kurodae* inseparable.

Salimali: whilst wing length of *salimali* is similar to that of *pacificus*, *kurodae* and *kanoi* (179.8 mm vs. 179.9 mm, 182.3 mm and 181.4 for *pacificus*, *kurodae* and *kanoi*, respectively), it is distinctly longer tailed (mean 79.0 mm vs. 75.1 mm, 71.1 mm and 72.4 mm for *pacificus*, *kurodae* and *kanoi*, respectively). Tail fork depth is similar in all four taxa, and as a consequence the relative depth of the tail fork expressed as a percentage of tail length is notably different, averaging 37.4% for *salimali* vs. 43.3%, 42.0 % and 42.0 % for *pacificus*, *kurodae* and *kanoi*, respectively. The similar wing length yet longer tail results in a lower wing-tail ratio for *salimali*, 2.28 vs. 2.40, 2.57 and 2.51 for *pacificus*, *kurodae* and *kanoi*, respectively.

In plumage, *salimali* differs notably from all taxa examined in the pattern of the throat patch, which forms a narrow pale strip on the centre of throat and is narrowest at the base of the bill, where it tapers to a neat point (Fig. 5). (One *leuconyx* specimen was examined which had been over-stretched during preparation. As a result the throat patch was rather elongated and superficially similar to that of *salimali* but this specimen was otherwise typical of *leuconyx*.) The throat patch is less than half the width of other taxa. The rump patch is consistently narrow (*c.*10 mm wide) and the crown and nape are mid brown, contrasting conspicuously with the mantle which is glossy black (Fig. 6). The pale tips to the underparts are much reduced compared to *pacificus*, *kurodae* and *kanoi*, and more comparable to *leuconyx* in this character.

TABLE 1
Key plumage differences in adult plumage of members of the *Apus pacificus* complex and closely related taxa.

	pacificus	*kurodae*	*kanoi*	*salimali*	*cooki*	*leuconyx*	*acuticauda*
Rump patch	Broad (*c.*20 mm wide) with few or no darker shaft-streaks	Broad to medium (*c.*15–20 mm wide) with few or no darker shaft-streaks	Broad to medium (*c.*15–20 mm wide) with few or no darker shaft-streaks	Narrow (*c.*10 mm wide) with indistinct dark shaft-streaks	Narrow (*c.*10 mm wide) with conspicuous dark shaft-streaks; these often broaden near the feather tip to form dark club-shaped marks	Narrow (*c.*10 mm wide) with fine but distinct dark shaft-streaks	None, rump and uppertail-coverts concolourous with mantle and tail
Throat patch	Very pale whitish, very well defined and not extending onto upper breast, dark shaft-streaks fine	Greyish, moderately well defined and not extending onto upper breast, dark shaft-streaks fine	Greyish, moderately well defined and not extending onto upper breast, dark shaft-streaks fine	Well-defined narrow off-white strip on centre of throat; narrowest at base of bill where tapers to a neat point; does not extend onto upper breast; dark shaft-streaks either extremely fine or lacking.	Off-white with well-defined black shaft-streaks, lower border ill-defined and extending onto upper breast	Off-white with fine dark shaft-streaks, lower border ill-defined typically extending onto upper breast and some mottling on throat patch, especially at sides and towards lower border	None, feathers black with very well-defined pure white fringes (i.e. same as rest of underparts)
Upperparts	Uniform dark brown, sometimes slightly darker on mantle	Uniform dark brown, sometimes slightly darker on mantle	Uniform dark brown, sometimes slightly darker on mantle	Crown and nape mid brown, contrasting with glossy black mantle	Entire upperparts including crown and nape black with extensive green iridescence, often with narrow white fringes to scapulars	Crown and nape mid brown, contrasting with glossy black mantle	Crown and nape blackish, contrasting with glossy black mantle
Underparts	Uniform dark brown with well defined but narrow off-white fringes	Uniform dark brown with well defined but narrow off-white fringes	Uniform dark brown with well defined but narrow off-white fringes	Uniform dark brown with greatly reduced pale fringes to feathers	Black with broad, well-defined pure white fringes	Upper breast mid brown, becoming darker over lower breast and rest of underparts; poorly defined pale tips to feathers	Black with broad, very well-defined pure white fringes
Underwing-coverts	Dark brown and similar in colour to rest of underwing	Dark brown and similar in colour to rest of underwing	Dark brown and similar in colour to rest of underwing	Dark brown and similar in colour to rest of underwing	Black and contrasting with the rest of underwing	Dark brown and similar in colour to rest of underwing	Black and contrasting with rest of the underwing

TABLE 2
Summary of key structural differences between members of the *Apus pacificus* complex and closely related taxa.

		Wing length (mm)	Tail length (mm)	Tail fork depth (mm)	Wing/tail ratio	Tail fork as % of tail length
pacificus	Max.	190.0	83.	42.0	2.80	51.6
	Min.	170.0	64.0	25.5	2.20	37.28
	Mean	179.9	75.1	32.7	2.40	43.3
	SD	4.63	4.47	3.6	0.13	3.89
	n	43	42	42	42	42
kurodae	Max.	188.0	77.0	34.0	2.79	49.2
	Min.	174.0	66.0	24.5	2.40	34.0
	Mean	182.3	71.1	29.8	2.57	42.0
	SD	4.54	3.4	3.3	0.12	4.86
	n	12	12	11	11	11
kanoi	Max.	191.5	78.5	37.5	2.85	52.3
	Min.	171.5	63.50	21.0	2.34	33.1
	Mean	181.4	72.4	30.4	2.51	42.0
	SD	4.07	3.25	3.25	0.11	3.50
	n	46	47	47	46	46
salimali	Max.	183.0	85.0	35.0	2.46	41.2
	Min.	177.0	72.0	24.0	2.14	31.2
	Mean	179.8	79.0	29.6	2.28	37.4
	SD	2.3	4.24	4.39	0.11	4.7
	n	6	6	6	6	6
leuconyx	Max.	170.0	73.0	27.0	2.66	39.1
	Min.	151.0	61.0	16.0	2.18	25.8
	Mean	161.1	67.9	23.5	2.38	34.6
	SD	5.43	3.97	3.44	0.14	4.40
	n	13	13	13	13	13
cooki	Max.	181.5	82.0	28.0	2.67	38.4
	Min.	162.0	65.0	15.0	2.17	21.7
	Mean	172.4	73.0	21.5	2.37	29.3
	SD	5.05	3.99	3.32	0.12	3.7
	n	18	16	17	16	16
*acuticauda**	Max.	181.6	75.1	27.2	2.79	37.8
	Min.	166.3	60.2	16.2	2.27	26.9
	Mean	173.4	69.1	22.2	2.57	32.2
	SD	4.55	4.98	3.72	0.17	3.53
	n	16	15	16	16	15

*data for all but one specimen provided by Janet Hinshaw (Museum of Zoology, University of Michigan, Ann Arbor)

Figure 1. Ventral view of specimens of Pacific Swift *Apus p. pacificus* (Paul J. Leader / Yamashina Institute for Ornithology)

Figure 2. Dorsal view of specimens of Pacific Swift *Apus p. pacificus* (Paul J. Leader / Yamashina Institute for Ornithology)

Figure 3. Ventral view of five specimens of Pacific Swift *Apus pacificus kanoi* on left and type specimen of *'kurodae'* on right (Paul J. Leader / Yamashina Institute for Ornithology)

Figure 4. Dorsal view of five specimens of Pacific Swift *Apus pacificus kanoi* on left and type specimen of *'kurodae'* on right (Paul J. Leader / Yamashina Institute for Ornithology)

Cooki: at 172.4 mm, *cooki* has the second shortest mean wing length after *leuconyx* (161.1 mm) and a tail length similar to that of *kurodae* and *kanoi* (73.0 mm vs. 71.1 mm and 72.4 mm). It has the shallowest tail fork (mean 21.5 mm vs. 23.5 mm for *leuconyx* and 29.6–32.7 mm for all other taxa), and the shortest relative depth of the tail fork expressed as a percentage of tail length (mean 29.3% vs. 34.6% for *leuconyx* and 37.4–43.3% for all other taxa).

Perhaps most importantly, whilst in all other taxa the longest primary was p2 in all individuals: *pacificus* (p2 1.1–8.5 mm longer than p1; n = 19), *kurodae* (2.1–6.1 mm longer; n = 11), *kanoi* (1.0–7.4 mm longer; n = 32), *salimali* (0.6–4.9 mm longer; n = 6) and *leuconyx* (1.3–4.8 mm longer; n = 9), of 18 *cooki* the longest primary is p1 on 13 (72%) being 1.0–4.0 mm longer than p2, the other five have p2 longest by 0.7–2.3 mm, which is at the lower end of the range for the other taxa.

I found *cooki* to be distinctive in plumage and readily separable from all other taxa using a number of criteria. The rump patch is narrow (*c*.10 mm wide) with conspicuous dark shaft-streaks which typically broaden near the feather tip to form broad, club-shaped dark marks (Fig. 8), rather than the, at most, narrow, dark shaft-streaks (usually none) of all other taxa. The upperparts and underparts are black and very different from all other taxa, which have dark brown upper- and underparts (or in the case of *salimali* and *leuconyx* black on the upperparts is restricted to the mantle). The underparts have broad, well-defined white fringes that approach those of *A. acuticauda* rather than any of the taxa in the *pacificus* complex (Fig. 8). The throat patch is off-white with well-defined black shaft-streaks (more pronounced than in other taxa) and extends onto the upper breast (Fig. 9). The upperparts possess an extensive green iridescence and often show narrow white fringes to the scapulars in fresh plumage. Finally, the underwing-coverts are black and contrast with the rest of the underwing, whereas in all other taxa the underwing-coverts are dark brown and hence similar to the rest of the underwing.

It should be noted that the holotype is a very worn breeding adult (collected 2 June 1912) and that the rest of a series at BMNH from the type locality (Gokteik Caves, eastern Myanmar) are juveniles lacking fully grown wings. As such they appear, superficially at least, smaller, duller and browner (especially the juveniles) than specimens of *cooki* from elsewhere. However, they all share a comparable rump patch size and patterning with other *cooki* specimens, and the adult, once the effects of wear are considered, is comparable with other *cooki* specimens I have examined.

Leuconyx: much the smallest of the taxa examined; mean wing length is 161.1 mm vs. 172.4 mm to 182.3 for all other taxa. Mean wing length is closest to that of *cooki*, from which it differs notably in other respects, especially plumage (see *cooki* for details). Mean tail length is also shortest; 67.9 mm vs. 72.4–79.0 mm in all other taxa.

In plumage *leuconyx* is most similar to *salimali* in that the rump patch is consistently narrow (*c*.10 mm wide) and the crown and nape are mid brown and contrast conspicuously with the mantle, which is glossy black (Fig. 10). However, the throat patch pattern is distinctly different, being broad (covering the entire throat), off-white with fine dark shaft streaks, while the lower border is ill-defined and typically extends onto the upper breast with some mottling within the throat patch, especially at the sides and towards the lower border (Fig. 9). The upper breast is mid brown, paler than in other taxa, becoming darker over the lower breast and the rest of the underparts.

Distribution and breeding ecology

Pacificus breeds from Siberia east to Kamchatka and northern Japan, south to northern China. It breeds from sea level to 3,000 m in Japan and nests on cliff faces and in caves, and on buildings. It is primarily a long to very long-distance migrant, with birds wintering

Right, top to bottom:

Figure 5. Ventral view of specimens of Sálim Ali's Swift *Apus salimali* (Paul J. Leader / © The Natural History Museum, Tring)

Figure 6. Dorsal view of specimens of Sálim Ali's Swift *Apus salimali* (Paul J. Leader / © The Natural History Museum, Tring)

Figure 7. Ventral view of specimens of Cook's Swift *Apus cooki* (Paul J. Leader / © The Natural History Museum, Tring)

in Indonesia, Melanesia, Australia and Tasmania.

Kurodae and its junior synonym *kanoi* (see below) breed across much of eastern China, southern Japan and Taiwan. In China, it breeds commonly in eastern Guangdong province, but its status further west is unclear and demands additional research (particularly in western Guangdong and eastern Guangxi with regard to the distribution of *cooki*). I have examined one *kanoi* specimen at ZMB collected on 15 May 1929 at Yao Shan, Guangxi, which was perhaps a local breeder. It nests on cliff faces, including sea cliffs (Lack 1956a) and in caves, and winters in Malaysia, the Philippines and Indonesia.

Salimali breeds at very high altitudes (above 3,400 m) and is restricted to the east Tibetan Plateau and adjacent high-altitude western Sichuan. It habitually nests on buildings, perhaps most famously in the Potala Palace, Lhasa. Its winter distribution is apparently unknown but, at the very least, it must be an altitudinal migrant.

Cooki is restricted to lowland Myanmar, northern Thailand, Vietnam and Guangxi province, China. Based on the available information, the taxon is restricted as a breeder to limestone caves (Smythies 1986, Wells 1999, Ngonjun & Sitasuwan 2001; P. D. Round *in litt.* 2009) and it appears that this is the only member of the *pacificus* complex that habitually breeds in limestone habitats, although this requires confirmation. It is

Right, top to bottom:

Figure 8. Dorsal view of specimens of Cook's Swift *Apus cooki* (Paul J. Leader / © The Natural History Museum, Tring)

Figure 9. Ventral view of specimens of Blyth's Swift *Apus leuconyx* (Paul J. Leader / © The Natural History Museum, Tring)

Figure 10. Dorsal view of specimens of Blyth's Swift *Apus leuconyx* (Paul J. Leader / © The Natural History Museum, Tring)

a short-distance migrant or near-resident and I have examined winter-collected specimens from Laos (November—YIO), Vietnam (January—BMNH), Cambodia (January—BMNH), the northern Shan States, Myanmar (January—BMNH), and there are two February Thai specimens (P. D. Round *in litt.* 2009).

Leuconyx is a mid to high-altitude breeder, occurring at 1,300–3,800 m in Pakistan, Nepal, Bhutan and north-east India. Presumably facilitated by its smaller size, this is the only member of the *pacificus* complex recorded utilising the nests of other birds, including those of hirundines (Lack 1956b). It is resident or partially migratory, wintering at lower altitudes in Nepal (Inskipp & Inskipp 1985) and peninsular India (Vaurie 1965).

There is much variation in the timing of the breeding between the various taxa, which is unsurprising given the large range of the *pacificus* complex and the marked differences in migratory behaviour. The southernmost taxon *cooki* is generally on eggs in Myanmar in May (Smythies 1986) or even early March in northern Thailand (Ngonjun & Sitasuwan 2001) while *leuconyx* breeds March–May in Nepal (Chantler 1999). However, most *pacificus* are just returning to the breeding grounds in May, with breeding in some areas commencing in June (Brazil 1991, Chantler & Driessens 1995).

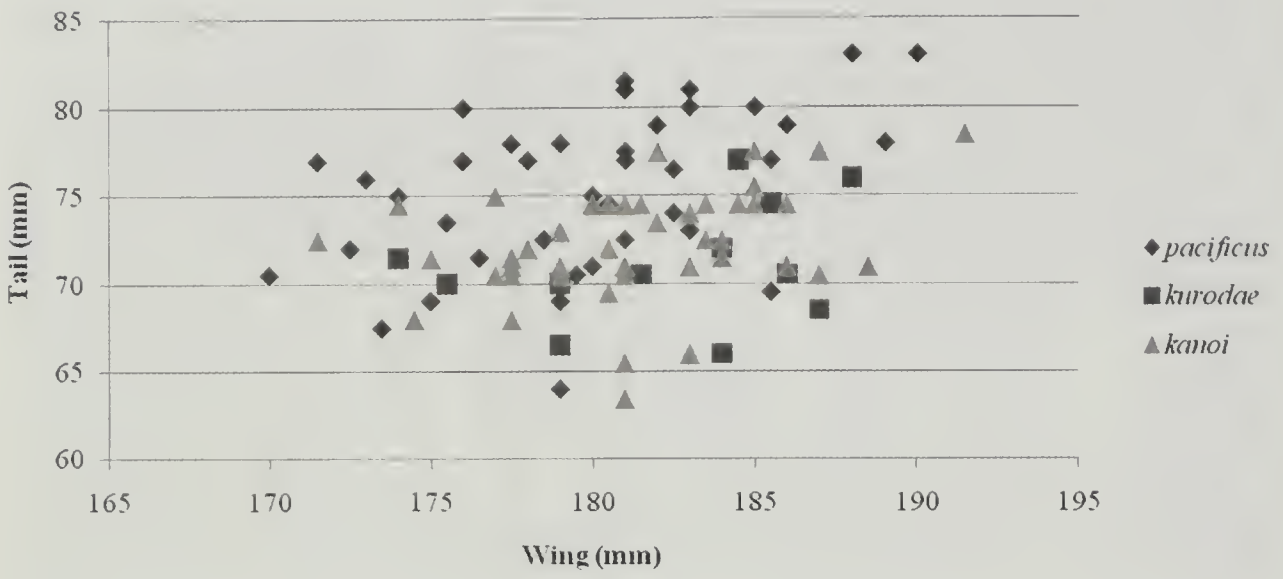

Figure 11. Scatter plot of wing and tail lengths (in mm) of *pacificus*, *kurodae* and *kanoi*.

Discussion

Based upon a combination of plumage and structure, I found each specimen of *saliuali*, *cooki* and *leucouyx* to be readily separable, and that *pacificus*, *kauoi* and *kurodae* whilst separable from the other taxa were very similar to each other. Both *kurodae* and *kauoi* are separable from *pacificus* when compared as a series on the basis of the cleaner, white throat patch and broader rump patch of *pacificus*, but there is substantial overlap in the size of the rump patch in these three taxa. I compared the holotype of *kauoi* to a series of *kurodae* from Japan and found them to be inseparable, being unable to detect any of the differences (darker body, stronger greenish gloss, narrower throat patch and rump patch) identified by Yamashina (1942). The type locality of *kurodae* is stated to be 'Japan' although the holotype was apparently lost during World War II (Mlíkovský 2007), making a comparison of the holotypes of *kauoi* and *kurodae* impossible. In size (wing and tail length) there is overlap between all three, but with most overlap between *kurodae* and *kauoi* and a very clear tendency for larger individuals to be *pacificus* (Fig. 11). Vaurie (1959, 1965) considered *kauoi* separable from *pacificus* based on differences in the upperparts and possibly the throat ('the white area of the throat is usually more restricted and less pure'), a feature which I found differentiated *saliuali* from *pacificus* (and other taxa). However, given that Vaurie (1959, 1965) treated *saliuali* as a synonym of *kauoi* and examined specimens that included material from within the range of *saliuali* but not, apparently, the type of *kauoi* I find his diagnosis of *kauoi* and treatment of *saliuali* unconvincing.

Based upon these findings, rather than treat *kurodae* as a synonym of *pacificus* I consider *kurodae* and *kauoi* to be synonyms, and as it predates *kauoi* by nine years, *kurodae* has precedence.

Despite frequently being treated as a junior synonym of *kauoi* (Vaurie 1959, 1965, Chantler 1995, 1999, Dickinson 2003), I found *saliuali* to be a highly diagnosable taxon, with all individuals examined separable from all other taxa, including *pacificus*, in both structure and plumage. As noted above, Lack (1959, 1965) and Vaurie (1959) differed in their treatment of *saliuali*, despite considering the same five specimens at BMNH collected in south-east Tibet. I also examined these five specimens, plus a further specimen from Sichuan at IOZ.

Lack (1958), in describing *salimali*, noted that the specimens were very similar to *leuconyx* in plumage but differed in being larger, however he did not make mention of the distinctly different throat pattern. Vaurie (1959, 1965) attached greater significance to the similar size of *salimali* to *kanoi*, but as discussed above, based on an examination of the holotypes of both taxa, I find his conclusion that *salimali* and *kanoi* are similar in terms of plumage unconvincing. It should also be noted that Vaurie (1959, 1965) used only wing length to assess size, and did not consider differences in tail length or tail structure. As demonstrated above, these are also important in the diagnosis of *salimali*.

It is noteworthy that Deignan (1956) considered 17 specimens from western Sichuan collected during July, August and October inseparable from a series of nine *kanoi* collected on the Batanes Islands, in the northern Philippines, and a further specimen from Fujian province, China. These Sichuan specimens may be *salimali*, which was described in the same year and of which Deignan was probably unaware at the time (his manuscript was submitted in April 1955), or they could indeed be *kanoi*, which may breed at lower altitudes in the region, although this scenario seems unlikely given that western Sichuan is generally much higher than other parts of the province. It should be noted that his August and October specimens are almost certainly migrants. Unfortunately, Deignan (1956) does not state in which collection(s) his Sichuan specimens are housed, as they clearly merit re-examination. Ali & Ripley (1970) somewhat surprisingly and without explanation, treated birds in south-east Tibet as *kanoi*, noting breeding in the Tsango Po Valley, which is the type locality of *salimali* (Lack 1958).

Of the taxa examined, *cooki* is by far the most distinctive in plumage, and has a distinctly different wing structure. The glossy black plumage and heavier rump patch streaking led Lack (1956b) to remark that *cooki* resembles Dark-rumped Swift *A. acuticauda* more that it resembles *pacificus*, and considered that '*cooki* completely bridges the [morphological] gap' between *pacificus* and *acuticauda*. This formed a large part of his argument that *acuticauda* should be treated as a subspecies of *pacificus*. Lack (1956b) noted the distinct wing structure of *cooki*, and commented: 'In some other species of *Apus*, as mentioned later, the difference between the first and second primary is a valuable aid in the determination of species, but in *A. pacificus* it varies within the species'. Vaurie (1959), by contrast, was unequivocal in his treatment of *acuticauda* as a valid species citing the all dark rump and distinct differences in tail feather shape (with *acuticauda* having highly attenuated outer tail feathers), and the close proximity (50 km) to breeding *acuticauda* and the nearest breeding *leuconyx* as evidence, but did not comment on differences in wing structure; his treatment of *acuticauda* has been widely adopted since.

Like Lack (1956b), I consider *cooki* to resemble *acuticauda* more than other members of the *pacificus* complex, being black above and below, and in the very broad white fringes to the underparts. It is also very similar in overall structure (Table 2) to *acuticauda*, to which it may prove to be more closely related. It should be noted that most data for *acuticauda* presented in Table 2 were not collected by the author, and as such I am reluctant to discuss the relationship between *cooki* and *acuticauda* in more detail. However, I consider it to be plausible that both taxa are not members of the *pacificus* complex (which may only comprise nominate *pacificus*, *kurodae*, *salimali* and *leuconyx*), and that the *pacificus* complex as currently recognised may be polyphyletic.

Conclusions

Given that *Apus* swifts are profoundly adapted to an aerial existence, it has been argued elsewhere (e.g. Brooke 1971) that consistent structural differences between apparently closely related taxa are of taxonomic significance (e.g. Fry *et al.* 1988). Such an approach

has led to a substantial revision of the genus *Apus* (primarily within the dark-rumped African taxa). Of the 17 species currently recognised by Gill & Donsker (2010), Lack (1956b) recognised just seven (Lack recognised ten species in the genus, but three of these are no longer placed in *Apus* by Gill & Donsker 2010).

There has been no systematic review of the *pacificus* complex since Lack (1956b) and Vaurie (1965), and based on my findings above I consider it clear that structural differences that have subsequently led to extensive taxonomic revision of congenerics are also evident in the *pacificus* complex. The taxonomic importance of these structural differences is further supported by consistent plumage differences, as well as by differences in migration strategies and breeding ecology.

When both measurements and plumages are assessed, *pacificus*, *salimali*, *cooki* and *leuconyx* all satisfy the diagnosibility requirements of the Phylogenetic Species Concept. Satisfying the non-interbreeding requirement of the Biological Species Concept (BSC) is problematic given that all four possess allopatric breeding ranges. However, it could be argued that the marked differences in the timing and altitude of breeding, migration strategy and, in the case of *cooki*, breeding habitat are effective isolating mechanisms and that some members of the *pacificus* complex meet the requirements of the BSC (perhaps most robustly in respect of *cooki*). Molecular studies and research into potential vocal differences (a review of a small number of recordings suggests clear differences between taxa) could further the taxonomic status of these taxa. I consider the present taxonomic arrangement of the *pacificus* complex untenable and that the complex is best treated as four separate species. Accordingly, I propose the following taxonomic treatment:

Pacific Swift *Apus pacificus* Latham, 1801
subspecies *kurodae* Domaniewski, 1933
Sálim Ali's Swift *Apus salimali* Lack, 1958
Blyth's Swift *Apus leuconyx* Blyth, 1845
Cook's Swift *Apus cooki* Harington, 1913

The English names chosen recognise the predominately far easterly distribution of *pacificus* (including *kanoi*) and avoid further use of the name 'Fork-tailed Swift' which I consider to be a distinctly inappropriate name given the structural characteristics of most members of the genus. With the exception of *pacificus*, I have shied away from geographical monikers, to avoid introducing the potentially confusing name Himalayan Swift for *leuconyx* (vs. Himalayan Swiftlet *Collocalia brevirostris*) and to commemorate some 'giants' of Asian ornithology.

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An undescribed *Ninox* hawk owl from the highlands of Central Sulawesi, Indonesia?

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Summary.—The Indonesian island of Sulawesi is a globally important hotspot of avian endemism, yet its birds are little studied and new species are still being discovered in the region. We present observations and photographs of an apparently undescribed taxon of *Ninox* hawk owl from 2,250 m on Gunung Rorekatimbu, Central Sulawesi. We reviewed specimens of all known South-East Asian *Ninox* owls and concluded that this bird's white-spotted underparts and pale supercilia are not shared by any other *Ninox* hawk owl in the region. Recordings attributed to it are strikingly similar to *Ninox ios*, but consistently have a longer inter-note interval between the paired main notes, and may be slightly lower in frequency. We believe it either represents a new subspecies of *N. ios* in Central Sulawesi, or it is a new species closely related to *N. ios*. If shown to be of species rank, we suggest the common name White-spotted Hawk Owl for it. Photographs of the unknown owl were taken in 1999 and a published photograph from 2007 likely pertains to it, but the bird's taxonomic status remains unresolved, and no specimens are known. Montane forest at the site is relatively intact and we are planning further work to address this problem.

Sulawesi, the largest landmass within the biodiversity hotspot of Wallacea, is a globally important centre of avian endemism with 42 endemic bird species. This is more than one-third of all species endemic to the Sulawesi region (Coates & Bishop 1997, Stattersfield *et al.* 1998, Mittermeier *et al.* 2004) and about one-sixth of its resident avifauna. Despite its biological richness, Sulawesi is ornithologically one of the most unfamiliar regions on Earth, and new species are still being described from the island and its satellites (Coates & Bishop 1997). Recently described species include Cinnabar Hawk Owl *Ninox ios* from mainland Sulawesi (Rasmussen 1999), Sangihe Scops Owl *Otus collari* from Sangihe Island (Lambert & Rasmussen 1998) and Togian Hawk Owl *Ninox burhani* and Togian White-eye *Zosterops somadikartai* from the Togian Islands in the Gulf of Tomini (Indrawan & Somadikarta 2004, Indrawan *et al.* 2008). Avian rediscoveries are also relatively frequent; for example, Banggai Crow *Corvus unicolor*, previously known only from two specimens of uncertain provenance, was recently rediscovered on Peleng Island in the Banggai archipelago (Mallo *et al.* 2010). Much of Sulawesi is mountainous, with an estimated 20% of its land area over 1,000 m elevation. Unsurprisingly, many of the island's endemic birds (e.g. Geomalia *Geomalia heinrichi*, Sombre Pigeon *Cryptophaps poecilorrhoa*) are restricted to the highlands (Whitten *et al.* 2002). Although Sulawesi's mountains have been explored to varying extents in the past century, few high-elevation areas have been visited recently and thus the montane avifauna is still poorly known (White & Bruce 1986, Collar 2009). Disconcertingly, accelerating habitat loss both outside and inside protected areas is threatening Sulawesi's avian diversity even before all of its species are described (King *et al.* 1999, Sodhi *et al.* 2005, Waltert *et al.* 2005, Cannon *et al.* 2007).

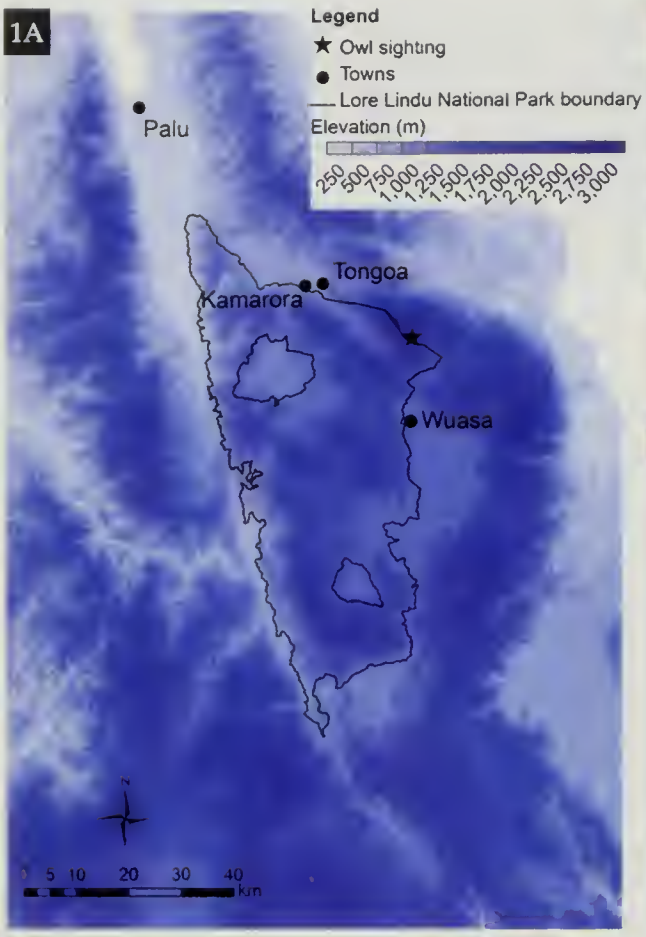
Wallacea supports an exceptionally diverse owl community with six *Tyto* barn owls, at least nine *Ninox* hawk owls and six *Otus* scops owls (Coates & Bishop 1997, BirdLife International 2009a). These nocturnal birds are even more poorly known than the region's diurnal avifauna. At least four new owl species have been described from Wallacea in the last two decades, namely two hawk owls and a scops owl from the Sulawesi region (Lambert & Rasmussen 1998, Rasmussen 1999, Indrawan & Somadikarta 2004) and a hawk owl in the Lesser Sundas (Olsen *et al.* 2002). The taxonomy and distribution of many Wallacean owl taxa is not well known and subject to revision. For example, recent evidence shows that the geographically variable Moluccan Hawk Owl *Ninox squamipila* probably involves a complex of three morphologically, vocally and genetically distinct species (Norman *et al.* 1998, Rasmussen 1999), yet their taxonomy remains unresolved. In the case of *N. ios*, the species is still known from only a single specimen, although there are now many photographs and sound-recordings from North Sulawesi, and putative records from Central Sulawesi (e.g., Lee & Riley 2001, Mauro 2001).

A new *Ninox*

Here we present observations and photographs of a distinctive medium-sized *Ninox* owl, which differs markedly in plumage from all other known Indonesian owls and is thus likely to represent an undescribed taxon. The owl was photographed by BM in July 1999 during the day, on the Anaso track on the east slope of Gunung Rorekatimbu (*c.*01°16.07'S, 120°19.02'E; *c.*2,250 m) in Central Sulawesi (Fig. 1). Tebb *et al.* (2008) also photographed and discussed a bird at *c.*1,700 m on Rorekatimbu that appears to be the same taxon.

Much of Gunung Rorekatimbu lies within Lore Lindu National Park (LLNP), a 217,991-ha protected area that supports *c.*78% of Sulawesi's endemic birds, as well as important populations of threatened endemic mammals (Coates & Bishop 1997, Prawiradilaga *et al.* 2006, Lee *et al.* 2007). LLNP is a key area for the conservation of threatened and range-restricted birds such as Maleo *Macrocephalon maleo* (Endangered), Snoring Rail *Aramidopsis plateni* (Vulnerable), Blue-faced Rail *Gymnocrex rosenbergii* (Vulnerable), Minahassa Owl *Tyto inexspectata* (Vulnerable), Cinnabar Hawk Owl (Vulnerable; see comments below concerning status in LLNP), Heinrich's Nightjar *Eurostopodus diabolicus* (Vulnerable) and Geomalia (Near Threatened) (Mauro 2001, Mauro & Drijvers 2000, Riley & Wardill 2003, BirdLife International 2009a,b).

Most of LLNP is mountainous and habitats and rainfall are variable (TNC 2004); annual rainfall in the north of the park, where Gunung Rorekatimbu is located, is 2,000–3,000 mm (SNRI 2008). The national park is under considerable pressure from increasing human population due to transmigration, expansion of cacao agriculture and illegal logging (Weber *et al.* 2007, Clough *et al.* 2009, Lee *et al.* 2009). In the early 1990s a logging company constructed a road and selectively logged montane forest from the Palu–Wuasa road to Puncak Dingin and Anaso. There are still many open areas along the road (now called the Anaso track), but the canopy is starting to close in places. In addition, most areas of the mountain away from the road are primary and mature secondary forest, from *c.*1,250 m to the summit of Gunung Rorekatimbu at 2,520 m. Forest on the mountain at *c.*1,500–2,000 m is up to 25 m tall and dominated by oaks such as *Castanopsis acuminatissima* (Fagaceae) and dammar (*Agathis* sp., Araucariaceae; Whitten *et al.* 2002). At *c.*2,250 m where the owl was photographed, the forest is lower in stature with abundant epiphytes. Dominant trees in this area include *Leptospermum* sp. (Myrtaceae) and *Dacrycarpus* sp. (Podocarpaceae), while *Rhododendron* and *Vaccinium* (Ericaceae) are common in the understorey (Whitten *et al.* 2002).



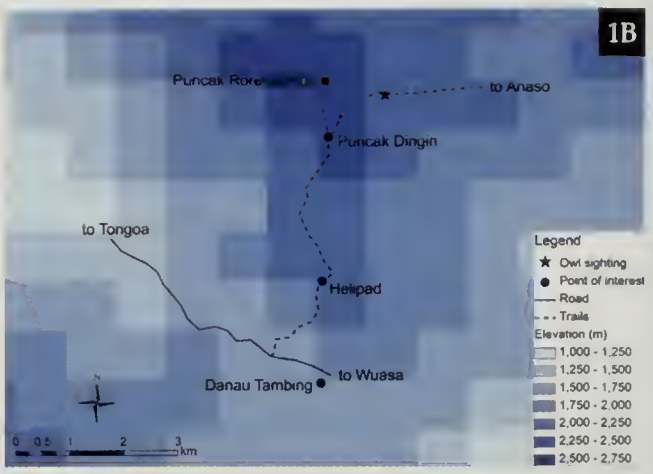


Figure 1A. Lore Lindu National Park region in Central Sulawesi, Indonesia. Elevation data are from World Clim, www.worldclim.org.

Figure 1B. Gunung Rorekatimbu area, showing the Anaso track and points of interest. Elevation data are from World Clim, www.worldclim.org.

Figure 2. Photograph of the apparently undescribed taxon from 1999 showing the spotted underparts (Buttu Madika)

Figure 3. Photograph of the apparently undescribed taxon from 1999 showing the pale supercilium (Buttu Madika)

In July 1999 BM & FNM (hereafter 'we') spent *c.*14 days on the Anaso track observing and photographing birds. Between one and two km from Puncak Dingin towards Anaso, we encountered an owl roosting in a *c.*6 m tall tree. We were able to approach it to within 5 m and take several photographs (Figs. 2–3). The owl displayed plumage characteristics that differed from other *Ninox* species found on Sulawesi with which we are familiar (Ochre-bellied *N. ochracea*, Speckled *N. punctulata* and Cinnabar Hawk Owls). The bird showed a

unique combination of two characteristics: large white spots on the underparts, and bold white supercilia.

Four *Ninox* hawk owls (three endemic residents and one winter visitor) are already known from LLNP. The endemics are Ochre-bellied Hawk Owl, found from the lowlands to 800 m (Coates & Bishop 1997, Rasmussen 1999), Speckled Hawk Owl found from the lowlands to 1,100 m (rarely to 2,300 m; Coates & Bishop 1997), and Cinnabar Hawk Owl found on Gunung Rorekatimbu, Gunung Rano Rano, Gunung Nokilalaki and Gunung Dali at 1,630–2,260 m (pers. obs.). The migratory Brown Hawk Owl has been recorded from sea level to 800 m (Coates & Bishop 1997). Two species from adjacent islands must also be considered: Togian Hawk Owl, recorded to 400 m in the Togian Islands (Indrawan & Somadikarta 2004) and the highly polytypic Moluccan Hawk Owl which is found from sea level to 1,750 m in the Moluccas (Coates & Bishop 1997). If confirmed as a new species, the undescribed taxon would increase the known resident *Ninox* species of Sulawesi to four, making the island home to the richest hawk owl assemblage in the world.

Diagnosis

For the unknown owl, the following diagnosis is based solely on three available photographs of the same individual showing the front of the bird, and therefore specimen material will be required to validate some of the taxon's characteristics, particularly those involving size and structure. Comparative material of other taxa used was primarily an extensive reference collection of specimen photographs taken at many museums, as well as photographs of several taxa available on Oriental Bird Images (OBI; http://orientalbirdimages.org/, accessed 6 April 2010) and elsewhere.

Our photographs show an earless, rufous owl almost certainly belonging to the genus *Ninox*, with boldly spotted underparts and prominent whitish supercilia extending from the base of the bill and ending above the eyes.

The crown appears dark, but resolution of the photographs is insufficient to determine whether patterning is present on the crown. The feathers of the pale supercilium appear to be somewhat upstanding, above the plane of the crown feathers. The supercilia form a shallow 'V' shape with the forecrown, and are bordered below (above the eye) by distinct zones of dark russet-brown feathers narrowest medially and broadest laterally. The irides appear to be pale yellow, lacking a narrow black ring on the exterior edge of the iris itself, but with a variably narrow dark eye-ring of bare skin, broadest and darkest over the anterior lateral half of the eye. The bill and cere are pale, and the nares are prominent. The ear-coverts are fairly uniform dark russet-brown, although they are palest below and behind the eye, and darkest to the sides of the bill, and they terminate in thin extensions beyond the rim of the facial disk. The feathers of the entire underparts from the lower breast to vent have large white or whitish spots, prominent white shaft-streaks, and strongly contrasting dark brown chevron-shaped tips. It appears probable from the photographs that the feathers of the upper breast have only small whitish spots and are mostly dark. The photographs do not show the dorsal surface.

In comparison with *N. ios* from North Sulawesi, our photographs appear to show that the putative new owl is more heavily built, with a relatively smaller head; a longer bill with relatively larger more prominent nares and with the cere more exposed; a relatively longer body; a relatively squarer tail; and heavier toes. It is possible that postural differences play a role in some of these perceived differences, but the overall shape of the unknown bird appears quite distinct from *N. ios*. In soft parts, the unknown owl appears to have paler yellow irides without the surrounding black iris ring or (as far as can be determined from photographs) narrow pinkish bare eye-ring, both present in *N. ios*, while being similar in the

colour of bill, toes and claws. Given that the photographs of the unknown bird were taken in daylight, while those of *N. ios* we have seen were taken with flash in darkness, these putative distinctions require substantiation. In ventral plumage, the unknown owl differs strikingly from North Sulawesi *N. ios* in its strong face pattern (vs. no apparent pattern in *N. ios*); the large white-spotted feathers over the entire underparts from breast to vent; and its less narrowly banded tail (hence with fewer visible tails bands). In addition, its feathering appears more compact, less full and fluffy, with the exception of the apparent ear-covert tufts. Note that there is only a single specimen of *N. ios*, the holotype held in Naturalis (Leiden), and the above comparisons were made with photographs of it and several photographs from Gunung Ambang, North Sulawesi on OBI and avocet.zoology.msu.edu. Most of the above-noted differences, which are based on comparisons of photographs, require further substantiation.

The type specimen and all photographs available in the above-mentioned photo archives of *N. ios* from North Sulawesi show fairly uniform rufous underparts, with at most subtle barring and / or speckling. However, a bird photographed in Lore Lindu in September 2007 and identified as *N. ios* appears very similar to our photographs (Tebb *et al.* 2008). The bird's voice was said to be similar to *N. ios* from North Sulawesi but its plumage shows the same bold, pale spots below and pale supercilium. Tebb *et al.* (2008) observed similarly marked birds in Lore Lindu in September 2004 and October 2006, although no photographs of these birds were published.

A photograph of putative *N. ios* from Lore Lindu on OBI (taken by E. Collaerts on 18 August 2008) has large pale (but not white) spots below, with dark brown chevron-like borders on the feather edges, and there appear to be fewer tail bands than in the North Sulawesi form of *N. ios*. Unfortunately the face of this individual is tilted away in the photograph, as it was taken from below, making it impossible to determine the degree of face patterning. Another photograph of putative *N. ios* from LLNP (by T. Sawbridge, September 2009, available at www.birdtourasia.com/sulawesireportsept09.html), shows a bird with similar, although more subtle, markings on the underparts. The face is partially obscured in the photograph but the supercilium appears pale, although not bright whitish as in our photographs. More tail bands are visible in the Sawbridge bird than in the Collaerts bird or our unknown owl, but this could be an artefact of the photograph. The birds photographed by Collaerts and Sawbridge are more subtly marked than our unknown owl, but it is still possible that these photographs represent the same taxon. It now appears that the Central Sulawesi population previously assumed to be *N. ios* is actually the unknown owl, in which case it must be highly variable in plumage (unlike *N. ios* from North Sulawesi).

We have considered the possibility that the unknown owl represents juvenile *Ninox ios*. Although, as far as we are aware, no data are available on the juvenile plumage of *N. ios*, this seems unlikely given the apparent difference in tail banding, the fact that the unknown owl appears no more and probably less fluffy and with more distinct markings (exactly the opposite of what would be expected based on juveniles of other *Ninox* species; PCR unpubl.), and the apparent differences in structure.

The unknown owl differs strongly from Ochre-bellied Hawk Owl *N. ochracea* in coloration, being largely russet with strong white spots below (vs. brown with an entirely or nearly unmarked ochraceous-buff belly in *N. ochracea*). Note also that although *N. ochracea* has a prominent white supercilium, it is narrow and runs into the pale feathering at the sides of the bill, forming an 'X' shape. It also has a mostly dark bill and its tail has very narrow pale bands and very broad dark ones. Juveniles of *N. ochracea* are similar to adults but fluffier and slightly duller below.

Compared to Brown Hawk Owl *N. scutulata* (all forms except the almost all dark *N.* [*s.*] *obscura* of the Andamans, considered a distinct species by Rasmussen & Anderton (2005), and including forms *randi* and *japonica* sometimes split on the basis of vocalisations), the unknown owl has much more extensive pale supercilia (vs. a small white triangle between the eyes, not extending above the eye in *N. scutulata*); an entirely pale (vs. largely dark) bill; dark bristles surrounding the bill (vs. whitish); a more russet-brown face (vs. largely dark grey in most *N. scutulata*); a very different underparts pattern with each feather primarily white surrounded by dark (vs. distinct large dark brown or rufescent heart- or chevron-shaped marks surrounded by white and forming stripes on the lower underparts, and more typical dark central feather streaking on the breast); and much narrower tail banding. In addition, the unknown bird appears to be distinct in shape from *N. scutulata*, having a less markedly small head and less compact plumage.

Compared to Andaman Hawk Owl *N. affinis*, the unknown bird differs in much the same ways as for *N. scutulata*, except that *N. affinis* has even paler feathering around the bill and typical dark central feather streaking on the lower underparts. In comparison to Hume's Hawk Owl *N.* [*scutulata*] *obscura*, the unknown bird is much paler and more russet overall, with very different markings and aspect.

The recently described Togian Hawk Owl *N. burhani* of the Togian Islands has a very different plumage pattern and colour to that of the unknown Lore Lindu owl. It is largely drab brown with a narrow white 'X' on the face, small white speckles on the brown crown and breast, and white lower underparts with dark brown streaking.

There are three poorly known large *Ninox* taxa in the Moluccas generally united under the name Moluccan Hawk Owl *N. squamipila*. However, these taxa are all so markedly different from each other that their taxonomy clearly requires revision (Rasmussen 1999, Rheindt & Hutchinson 2007). Nominate *N. s. squamipila* from Seram has a dark brown head with a whitish 'X' facial pattern; rufous-brown underparts, the lower underparts narrowly dark-banded, with broader white bands; and a strongly banded tail with narrow dark and broader pale bands. The form on Halmahera, *N. s. hypogramma*, is rather similar in plumage to *N. s. squamipila* but is darker especially on the head and has equal-width, narrow dark and light bands below, and the undertail is at most obscurely banded. The Buru form *N. s. hantu* appears much more similar to the unknown owl because it is largely rufescent, but it has narrowly dark-banded underparts with slightly broader rufescent bands, and a rather faintly banded undertail. None of the heterogeneous taxa currently comprising *N. squamipila* are at all similar to the unknown *Ninox*.

The recently described Little Sumba Boobook *N. sumbaensis* (Olsen *et al.* 2002) is also very different in plumage from our unknown owl, being generally dull brown with fine wavy black lines over the underparts. It does have well-marked white supercilia, but these are smaller and less distinct than in the Lore Lindu owl.

Ninox philippensis is another heterogeneous grouping of taxa, which fall into three major groups on plumage type, none of which resemble our Lore Lindu owl. The unknown owl also differs greatly from the following species, which will therefore not be considered here: Speckled Boobook *N. punctulata*, Sumba Boobook *N. rudolfi*, the several forms of Southern Boobook *N. boobook* and Barking Boobook *N. connivens*. Finally, none of the *Ninox* species from outside the Oriental region are similar to the unknown Lore Lindu owl.

Discussion

The photographs described above and our preliminary diagnosis suggests that there is a probable new taxon of *Ninox* hawk owl in Lore Lindu National Park (LLNP). The status of *Ninox* species in LLNP is confused and it now appears likely that some or all birds assumed

to be *N. ios* in Central Sulawesi pertain to the new taxon. Alternatively, the strongly marked unknown owl could be an undescribed species, even though its voice is apparently similar to North Sulawesi *N. ios*. If the owl is shown to be of species rank, we propose the English name White-spotted Hawk Owl to highlight its unique, boldly spotted underparts. The two records come from montane forest (at *c.*1,700 m: Tebb *et al.* 2008, and *c.*2,250: this paper). We are unable to speculate further on possible habitat preferences.

We compared nine recordings (by JBCH, YDL on AVoCet, www.avocet.zoology.msu.edu, and by R. Hutchinson) believed to be *N. ios* from Lore Lindu with recordings and vocal descriptions of *N. ios* from Gunung Ambang, North Sulawesi (two recordings on www.xeno-canto.org, five on AVoCet, and one by R. Hutchinson; King 2005, Hutchinson *et al.* 2006). Although Lore Lindu birds possess vocalisations strikingly similar in quality and pattern to Gunung Ambang birds, inter-note intervals between the couplets that comprise each song strophe are consistently longer in Lore Lindu birds. In addition, the apparent frequency is slightly lower in each of the available samples from AVoCet and xeno-canto of Lore Lindu birds than in those from Gunung Ambang. The vocal evidence strengthens the case for the occurrence of *N. ios* in Central Sulawesi. One published paper also suggests, based on a sight record without photographic documentation, that *N. ios* (with North Sulawesi-like plumage) occurs in LLNP (Mauro 2001). Clearly, more research is needed to clarify the systematics, distribution and ecology of Sulawesi's *Ninox* owls.

On several occasions since 1999, we have unsuccessfully searched the area at 660–2,520 m for any owl differing from those already known in the LLNP. In 2006 we listened for owls at Danau Tambing (01°19.06'S, 120°18.05'E; 1,675 m) and Kamarora (01°11.05'S, 120°08.02'E; 660 m) (Fig. 1). In 2007 we conducted nocturnal searches from Danau Tambing, to Puncak Dingin, to Anaso at 1,675–2,315 m. In 2009 we performed night surveys and daylight searches for roosting birds from 2–5 November and 4–8 December in the same areas as 2007, and continued to Puncak Rorekatimbu at 2,520 m. The forest in these areas is maturing since the selective logging of the early 1990s and the habitat appears to be improving over time with the current levels of minimal disturbance. We are planning further surveys targeted towards resolving the mystery concerning the identity and status of this bird, and invite anyone with relevant data to contact us.

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Gender agreement of avian species-group names under Article 31.2.2 of the ICZN Code

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SUMMARY.—The present article examines the nature of several species-group names that are grammatically nouns as well as adjectives, as covered by Art. 31.2.2 of the ICZN (1999) Code. We looked at 139 avian species-group names, 69 of which proved to be nouns and 70 adjectives. Of these 139 names, 18 would need to be corrected in the reference list that we followed (Dickinson 2003). They are: *Leptoptilos crumenifer* (adjective), *Threskiornis moluccus* (adjective), *Aramides cajaneus* (adjective), *Porphyrio martinicus* (adjective), *Turnix sylvaticus lepurana* (noun), *Ducula aenea vicinus* (noun), *Amazona mercenarius* (noun), *Otus choliba cruciger* (adjective), *Aegotheles bennettii plumifer* (adjective), *Pogoniulus coryphaea* (noun), *Schiffornis turdina amazonum* (noun), *Frederickena unduliger* (noun), *Premnornis guttuliger* (adjective), *Monarcha vidua* (noun), *Calyptocichla serinus* (noun), *Turdus libonyana* (noun), *Erythrura trichroa sigillifer* (noun) and *Thraupis episcopus nesophila* (adjective).

In an earlier assessment of the gender agreement of avian species names (David & Gosselin 2002a), we pointed out that scientific names that are grammatically nouns as well as adjectives are covered by Art. 31.2.2 of the ICZN (1999) Code and must be evaluated on an *ad hoc* basis. Here we review avian names that fall in that category.

Art. 31.2.2 (ICZN 1999) and its accompanying example state:

> 'Where the author of a species-group name did not indicate whether he or she regarded it as a noun or as an adjective, and where it may be regarded as either and the evidence of usage is not decisive, it is to be treated as a noun in apposition to the name of its genus (the original spelling is to be retained, with gender ending unchanged; see Article 34.2.1).
>
> Example. Species-group names ending in *–fer* and *–ger* may be either nouns in apposition, or adjectives in the masculine gender. *Cephenemyia phobifer* (Clark) has often been used as *C. phobifera*, but the original binomen was *Oestrus phobifer*; since *Oestrus* is masculine, *phobifer* in that binomen may be either a masculine adjective or a noun in apposition; hence it is to be treated as a noun in apposition and not changed when combined with the feminine generic name *Cephenemyia*.'

Therefore, a species-group name must be treated as a noun in apposition when the three following conditions are *all* met: (1) where the author did not indicate whether he or she regarded it as a noun or as an adjective; (2) where the name may be regarded as a noun as well as an adjective; and (3) where there is no decisive evidence of usage as an adjective.

(1) An author 'indicates' how he regards a name when he 'makes it known or shows (more or less distinctly)' (Little *et al.* 1973). An indication may be a formal statement specifying that the name is a noun or an adjective, or any sort of relevant information. In other words, one must determine if the original work contains an indication that provides a conclusion.

(2) Many classical Latin words are formed from the verbs *ferre* [to carry] or *gerere* [to bear]: some are nouns (*crucifer, furcifer*, etc.), most are adjectives (*armifer, ensifer, criniger, flammiger, plumiger, squamiger*, etc.), and a few (*armiger, lucifer*, etc.) may be nouns or adjectives (Glare 1982). In the example quoted above, a newly derived word, such as *phobifer*, should be regarded as a noun or an adjective.

(3) The word 'usage' has different meanings: 'established practice' and 'action of using' are two of them (Little *et al.* 1973). It must be emphasised that Art. 31.2.2 avoids the term 'prevailing usage', which is defined in the ICZN (1999) glossary, where it applies to subsequent spellings other than mandatory changes to the gender endings of names (see Arts. 33 and 34). The French text of Art. 31.2.2 (which is equivalent in force, meaning, and authority—Art. 86.2) is structured differently than the English one, and helps interpreting the meaning of 'evidence of usage'. It states: '*Si une épithète peut être considérée indifféremment comme un substantif ou comme un adjectif, sans que l'usage qui en est fait ne permette de conclure, et si son auteur n'a pas tranché la question, elle doit être traitée comme un substantif en apposition.*' A direct translation into English gives: '*If an epithet may be considered indifferently as a noun or as an adjective, without the use that it is put to permitting a conclusion, and if its author did not settle the matter, it must be treated as a noun in apposition.*'

The phrase '*sans que l'usage qui en est fait ne permette de conclure / without the use that it is put to permitting a conclusion*' makes clear that 'usage' relates first of all to use by the author in the original publication. So the word 'decisive', in the English text, means conclusive, and the noun vs. adjective status must be determined from the original publication, not from random subsequent use. The example included under Art. 31.2.2 states clearly that *phobifer* (a newly derived Latin word) in the original combination *Oestrus phobifer*, where the genus is masculine, is to be treated as a noun in apposition even though the subsequent combination *Cephenemyia phobifera* has often been used. This is because there was no decisive evidence of its use as an adjective in the original work.

It must be noted, however, that the gender ending of some genuine adjectives is occasionally incorrect in the original combination itself, and must then be corrected according to Art. 34.2 of the Code (ICZN 1999).

The present article uses Dickinson (2003) as its baseline for assessing species-group names. Correct spellings that differ from those used by Dickinson (2003) are presented in bold type. In order to make it easier to follow changes in gender agreement when an adjective is moved from one genus to another, the gender of each genus is indicated in square brackets [M = masculine, F = feminine, N = neuter] in the tables.

In the tables, we indicate the current spelling (Dickinson 2003) as well as the correct spelling (in bold type) when it differs.

Names ending in *–fer, –fera* or *–ger, –gera*

As stated above, many classical Latin words ending in *–fer* or *–ger* are formed from the verbs *ferre* (to carry) or *gerere* (to bear): some are nouns, most are adjectives, and a few are nouns as well as adjectives (Glare 1982). It must be noted that there are no classical Latin nouns ending in *–ferus* and *–gerus*, and these can therefore only be adjectives, on the model of the participle *morigerus, –a, –um* (or on the model of words where the adjectival suffix *–us, –a, –um* is added to a noun ending with a consonant [such as *r*]: Woods 1944).

According to Art. 31.2.2 (ICZN 1999), newly derived names, such as *phobifer*, are nouns in apposition unless the original work includes an indication of their use as adjectives. On

the other hand, given their grammatical properties, newly derived names originally ending in *–fera, –ferum* or *–gera, –gerum* may be taken as indicative of adjectival use.

Among the avian species-group names in the present category, some are solely adjectives or solely nouns in classical Latin (Glare 1982) and are not addressed here. Table 1 shows only those that can be either nouns or adjectives under Art. 31.2.2 (ICZN 1999) and is split according to which must be treated as nouns and which must be considered as adjectives.

The six names marked for correction in Table 1 warrant comments in reference to the spellings used by Dickinson (2003):

Strix crucigera von Spix, 1824, in which *crucigera* is adjectival, must be spelled *Otus choliba* ***cruciger*** or *Megascops choliba* ***cruciger*** (not *crucigerus*) because *–ger* and *–fer* are the usual masculine forms of *–gera* and *–fera* (as noted in the example of Art. 31.2.2, above).

Ciconia crumenifera Lesson, 1831, in which *crumenifera* is adjectival, must be spelled *Leptoptilos* ***crumenifer*** (not *crumeniferus*) because *–fer* is the usual masculine form of *–fera*. Note: *Leptoptilos crumenifer* was used by Reichenow (1900). In his symonymy, he lists a majority of *Leptoptilos* / *Leptoptilus crumenifer*, several *L. crumeniferus*, and two or three *L. crumenifera*. *Leptoptilos crumeniferus* has been used since Peters (1931).

Thripophaga guttuligera P. L. Sclater, 1854, in which *guttuligera* is adjectival, must be spelled *Premnornis* ***guttuliger***.

Aegotheles plumifera Ramsay, 1883, in which *plumifera* is adjectival, must be spelled *Aegotheles bennettii* ***plumifer*** (not *plumiferus*) because *–fer* is the usual masculine form of *–fera*.

Lobospingus sigillifer DeVis, 1897, in which *sigillifer* has to be taken as a noun in apposition, must be spelled *Erythrura trichroa* ***sigillifer***.

Thamnophilus unduliger von Pelzeln, 1869, in which *unduliger* must be treated as a noun in apposition, must be spelled *Frederickena* ***unduliger***. Note: this combination was used from 1869 to 1914, followed by *Taraba* [M] *unduliger* (Chapman 1917). *Mackenziaena* [F] *unduliger* was used by Cory & Hellmayr (1924), but *Frederickena unduligera* has been in use since Peters (1951).

Classical Latin words that are nouns as well as adjectives

Some species-group names are classical Latin words that are nouns as well as adjectives (Table 2), and must be treated under Art. 31.2.2 (ICZN 1999). We examined 23 cases and conclude from their original grammatical properties that all must be treated as nouns, and that the gender ending of three of them was changed unduly because nothing in the original description indicates that any are adjectives. Consequently:

Psittacus mercenarius von Tschudi, 1844, in which *mercenarius* has to be taken as a noun in apposition, must be spelled *Amazona* ***mercenarius***.

Muscadivores aeneus vicinus Riley, 1927, in which *vicinus* has to be taken as a noun in apposition, must be spelled *Ducula aenea* ***vicinus***.

Piezorhynchus vidua Tristram, 1879, in which *vidua* has to be taken as a noun in apposition, must be spelled *Monarcha* ***vidua***.

The adjective *nesophilus, –a, –um*

In listing *Thraupis episcopus nesophilus* Riley, 1912, Storer (1970: 319, footnote) states that 'words compounded with the root *–philus* may be treated as nouns or as adjectives' and that '*nesophilus* in this instance stands in apposition and is to be written as a masculine noun'. However, the final component *–philus* is the Latinized Greek adjective φιλος (philos: fond of) (Liddell & Scott 1996). Once Latinized, compound species-group names ending in

TABLE 1

Status of original species-group names ending in *–fer*, *–ger*, *–fera* or *–gera*.

Original combination	Status	Current combination (Dickinson 2003)
Tetraogallus [M] *tibetanus aquilonifer* R. & A. Meinertzhagen,1926	Noun	*Tetraogallus* [M] *tibetanus aquilonifer*
Accipiter [M] *guttifer* Hellmayr, 1917	Noun	*Accipiter* [M] *bicolor guttifer*
Caprimulgus [M] *pectoralis guttifer* Grote, 1921	Noun	*Caprimulgus* [M] *ruwenzorii guttifer*
Picumnus [M] *guttifer* Sundevall, 1866	Noun	*Picumnus* [M] *albosquamatus guttifer*
Tarsiger [M] *guttifer* Reichenow & Neumann, 1895	Noun	*Pogonocichla* [F] *stellata guttifer*
Totanus [M] *guttifer* von Nordmann, 1835	Noun	*Tringa* [F] *guttifer*
Dendrocolaptes [M] *lacrymiger* de Lafresnaye, 1849	Noun	*Lepidocolaptes* [M] *lacrymiger*
Myrmelastes [M] *exsul maculifer* Hellmayr, 1906	Noun	*Myrmeciza* [F] *exsul maculifer*
Dimorpha [F] *monileger* Hodgson, 1845	Noun	*Ficedula* [F] *monileger*
Batrachostomus [M] *moniliger* Blyth, 1846	Noun	*Batrachostomus* [M] *moniliger*
Dendrexetastes [M] *rufigula moniliger* Zimmer, 1934	Noun	*Dendrexetastes* [M] *rufigula moniliger*
Formicarius [M] *moniliger* P. L. Sclater, 1857	Noun	*Formicarius* [M] *analis moniliger*
Cephalopterus [M] *penduliger* P. L. Sclater, 1859	Noun	*Cephalopterus* [M] *penduliger*
Nystactes [M] *tamatia punctuliger* Todd, 1943	Noun	*Bucco* [M] *tamatia punctuliger*
Thamnophilus [M] *punctuliger* von Pelzeln, 1869	Noun	*Thamnophilus* [M] *aethiops punctuliger*
Edolius [M] *remifer* Temminck, 1823	Noun	*Dicrurus* [M] *remifer*
Cinclosoma [N] *setafer* Hodgson, 1836	Noun	*Garrulax* [M] *lineatus setafer*
Lobospingus [M] *sigillifer* De Vis, 1897	Noun	*Erythrura* [F] *trichroa sigillifera* [should be ***sigillifer***]
Oriolus [M] *chlorocephalus speculifer* Clancey, 1969	Noun	*Oriolus* [M] *chlorocephalus speculifer*
Anthipes [M] *submoniliger* Hume, 1877	Noun	*Ficedula* [F] *solitaris submoniliger*
Tyrannus [M] *tuberculifer* de Lafresnaye & d'Orbigny, 1837	Noun	*Myiarchus* [M] *tuberculifer*
Thamnophilus [M] *unduliger* von Pelzeln, 1869	Noun	*Frederickena* [F] *unduligera* [should be ***unduliger***]
Trochilus [M] *violifer* Gould, 1846	Noun	*Coeligena* [F] *violifer*
Aedicnemus [M] *vocifer* l'Herminier, 1837	Noun	*Burhinus* [M] *bistriatus vocifer*
Falco [M] *vocifer* Daudin, 1800	Noun	*Haliaeetus* [M] *vocifer*
Strix [F] *crucigera* von Spix, 1824	Adjective	*Otus* [M] *choliba crucigerus* [should be ***cruciger***]
Ciconia [F] *crumenifera* Lesson, 1831	Adjective	*Leptoptilos* [M] *crumeniferus* [should be ***crumenifer***]
Hirundo [F] *filifera* Stephens, 1825	Adjective	*Hirundo* [F] *smithii filifera*
Ptilotis [M] *filigera* Gould, 1851	Adjective	*Xanthotis* [M] *flaviventer filiger*
Thripophaga [F] *guttuligera* P. L. Sclater, 1854	Adjective	*Premnornis* [M] *guttuligera* [should be ***guttuliger***]
Calliste [F] *lunigera* P. L. Sclater, 1851	Adjective	*Tangara* [F] *parzudakii lunigera*
Cinclosoma [N] *monilegera* Hodgson, 1836	Adjective	*Garrulax* [M] *monileger*
Aegotheles [M] *plumifera* Ramsay, 1883	Adjective	*Aegotheles* [M] *bennettii plumiferus* [should be ***plumifer***]
Ortyx [F] *plumifera* Gould, 1837	Adjective	*Oreortyx* [M] *pictus plumifer*
Geophaps [F] *plumifera* Gould, 1842	Adjective	*Geophaps* [F] *plumifera*
Numida [F] *plumifera* Cassin, 1857	Adjective	*Guttera* [F] *plumifera*
Thalurania [F] *colombica rostrifera* W. H. Phelps & W. H. Phelps, Jr. 1956	Adjective	*Thalurania* [F] *colombica rostrifera*
Emberiza [F] *speculifera* de Lafresnaye & d'Orbighy, 1837	Adjective	*Diuca* [F] *speculifera*
Schistochlamys [F] *speculigera* Gould, 1855	Adjective	*Conothraupis* [F] *speculigera*
Muscicapa [F] *speculigera* Bonaparte, 1851	Adjective	*Ficedula* [F] *hypoleuca speculigera*
Synallaxis [F] *sulphurifera* Burmeister, 1868	Adjective	*Cranioleuca* [F] *sulphurifera*

TABLE 2

Status of original species-group names that are classical Latin nouns as well as adjectives.

Original combination	Status	Current combination (Dickinson 2003)
Psittacus [M] *mercenarius* von Tschudi, 1844	Noun	*Amazona* [F] *mercenaria* [should be ***mercenarius***]
Alauda [F] (*Megalophonus*) *plebeja* Cabanis, 1875	Noun	*Mirafra* [F] *sabota plebeja*
Phrygilus [M] *plebejus* von Tschudi, 1844	Noun	*Phrygilus* [M] *plebejus*
Ixos plebejus [M] Cretzschmar, 1828	Noun	*Turdoides* [F] *plebejus*
Turdus [M] *plebejus* Cabanis, 1861	Noun	*Turdus* [M] *plebejus*
Larus [M] (*Dominicanus*) *vetula* Bruch, 1853	Noun	*Larus* [M] *dominicanus vetula*
Muscipipra [F] *vetula* M. H. C. Lichtenstein, 1823	Noun	*Muscipipra* [F] *vetula*
Penelope [F] *vetula* Wagler, 1830	Noun	*Ortalis* [F] *vetula*
Cuculus [M] *Vetula* Linnaeus, 1758	Noun	*Saurothera* [F] *vetula*
Cercomacra [F] *tyrannina vicina* Todd, 1927	Noun	*Cercomacra* [F] *tyrannina vicina*
Muscadivores [M] *aeneus vicinus* Riley, 1927	Noun	*Ducula* [F] *aenea vicina* [should be ***vicinus***]
Cinnyris [M][1] *sericea vicina* Mayr, 1936	Noun	*Leptocoma* [F] *sericea vicina*
Ptilotis [M][2] *analoga vicina* Rothschild & Hartert, 1912	Noun	*Meliphaga* [F] *vicina*
Halcyon [F] *chloris vicina* Mayr, 1931	Noun	*Todiramphus* [M] *chloris vicina*
Chordeiles [M] *virginianus vicinus* Riley, 1903	Noun	*Chordeiles* [M] *gundlachii vicinus*
Dicrurus [M] *hottentottus vicinus* Rensch, 1928	Noun	*Dicrurus* [M] *hottentottus vicinus*
Passer [M] *melanurus vicinus* Clancey, 1958	Noun	*Passer* [M] *melanurus vicinus*
Ptilopus [M] *lewisii vicinus* Hartert, 1895	Noun	*Ptilinopus* [M] *viridis vicinus*
Harpactes [M] *vidua* Ogilvie-Grant, 1892	Noun	*Harpactes* [M] *orrhophaeus vidua*
Hypocnemis [F] *vidua* Hellmayr, 1905	Noun	*Hylophylax* [M] *poecilinotus vidua*
Motacilla [F] *vidua* Sundevall, 1850	Noun	*Motacilla* [F] *aguimp vidua*
Rhipidura [F] *vidua* Salvadori & Turati, 1874	Noun	*Rhipidura* [F] *rufiventris vidua*
Piezorhynchus [M] *vidua* Tristram, 1879	Noun	*Monarcha* [M] *viduus* [should be ***vidua***]

[1] *Cinnyris* was treated as feminine by Mayr (1936), but it is now masculine according to the ICZN (1999) Code—see David & Gosselin (2002b).

[2] *Ptilotis* was treated as feminine by Rothschild & Hartert (1912), but it is now masculine according to the ICZN (1999) Code.

–philus and *–phila* are to be treated as adjectives only (ICZN 1999: Art. 31.2, 34.2) and do not fall under Art. 31.2.2. It is thus apparent that Riley (1912) used *nesophilus* because he thought *Thraupis* was masculine on account of the masculine ending of *episcopus*. However, *episcopus* is a noun in apposition. Consequently:

Thraupis [F] *episcopus nesophilus* Riley, 1912, must be corrected to *Thraupis episcopus* ***nesophila***.

The species-group names *phoenicurus* and *phoenicura*

The three original species-group names *phoenicura* in Dickinson (2003) are the Latinized feminine form of the properly formed Greek adjectival φοινικουρος (phoinikouros: red-tailed), and their current combinations reflect this (Table 3).

On the other hand, the five original *phoenicurus* are either the Latin noun *phoenicurus* (redstart) or the Latinized masculine Greek adjectival φοινικουρος. Except for *Gallinula phoenicurus* Pennant, 1769, and *Motacilla Phoenicurus* Linnaeus, 1758, where *phoenicurus* was originally combined with a feminine genus, and hence treated as a noun, all other authors quoted in Table 4 specifically referred to the red / ferruginous / chestnut tail of the species in question, an indication of the 'red-tailed' adjectival meaning.

TABLE 3

Status of the species-group name *phoenicura*.

Original combination	Status	Current combination (Dickinson 2003)
Mirafra [F] *phoenicura* Franklin, 1831	Adjective	*Ammomanes* [F] *phoenicura*
Rhipidura [F] *phoenicura* Müller, 1843	Adjective	*Rhipidura* [F] *phoenicura*
Tyrannula [F] *phoenicura* P. L. Sclater, 1855	Adjective	*Myiotriccus* [M] *ornatus phoenicurus*

TABLE 4

Status of the species-group name *phoenicurus*.

Original combination	Status	Current combination (Dickinson 2003)
Attila [M] *phoenicurus* von Pelzeln, 1868	Adjective	*Attila* [M] *phoenicurus*
Conurus [M] *phoenicurus* Schlegel, 1864	Adjective	*Pyrrhura* [F] *molinae phoenicura*
Eremobius [M] *phoenicurus* Gould, 1839	Adjective	*Eremobius* [M] *phoenicurus*
Gallinula [F] *phoenicurus* Pennant, 1769	Noun	*Amaurornis* [F] *phoenicurus*
Motacilla [F] *Phoenicurus* Linnaeus, 1758	Noun	*Phoenicurus* [M] *phoenicurus*

The species-group names *coryphaea* and *coryphaeus / coryphoeus*

In the combination *Barbatula* [F] *coryphaea* Reichenow, 1892, the word *coryphaea* is either the Latinized Greek noun κορυφαια (koruphaia: tuft on the crown) or the Latinized feminine form of the Greek adjective κορυφαιος (koruphaios: at the top). In the original description, Reichenow did not indicate that he was using the adjectival form, therefore *coryphaea* is here a noun. Consequently:

Barbatula coryphaea Reichenow, 1892, in which *coryphaea* is to be taken as a noun in apposition, must be spelled *Pogoniulus* ***coryphaea***.

The Karoo Scrub Robin has long been known as *Erythropygia* [F] *coryphaeus* (e.g. Ripley 1964) or *Cercotrichas* [F] *coryphaeus* (e.g. Wolters 1982, Keith *et al.* 1992), from *Sylvia* [F] *coryphaeus* Lesson, 1831. Lesson's *coryphaeus* is the Latin noun *coryphaeus* (chief of chorus) used as a noun in apposition, as indicated by its combination with the feminine genus *Sylvia*. However, Clancey & Brooke (1990: 143) showed that the original description is to be cited as *Sylvia coryphoeus* Vieillot, 1817. Lesson's *coryphaeus* differs in spelling from Vieillot's *coryphoeus*, but whether the correct spelling is taken to be *coryphaeus* or *coryphoeus*, there is no evidence of an adjectival use in the original description.

The species-group names *amazonus, amazona, amazonum*

The nouns '*amazonus*' and '*amazona*' do not exist in classical Latin. Thus the epithets *amazonus* and *amazona* are the adjectival form of *Amazon* (classical Latin noun), where the adjectival suffixes *–us*, *–a* are added to a noun ending with a consonant (Woods 1944). The original (and proper) combinations (Table 5) all represent variable adjectives.

However, the plural genitive of the Greek noun 'Amazôn' (Αμαζων), declined like 'daimôn', is Amazonon, Latinized as *Amazonum*. Since there is no clear evidence of an adjectival use in the original combinations, all *amazonum* must be treated as a noun in the genitive case (Table 5), the default conclusion of the ICZN Code (1999) in the case of non-existent or conflicting evidence. Consequently:

Heteropelma amazonum P. L. Sclater, 1861, in which *amazonum* has to be taken as a noun in the genitive case, must be spelled *Schiffornis turdina* ***amazonum*** (*contra* David & Gosselin 2002b: 280).

TABLE 5
Status of the species-group names *amazonus, amazona* and *amazonum*.

Original combination	Status	Current combination (Dickinson 2003)
Alcedo [F] *amazona* Latham, 1790	Adjective	*Chloroceryle* [F] *amazona*
Capsiempis [F] *flaveola amazona* Zimmer, 1955	Adjective	*Capsiempis* [F] *flaveola amazona*
Pipromorpha [F] *macconnelli amazona* Todd, 1921	Adjective	*Mionectes* [M] *macconnelli amazonus*
Pachyramphus [M] *castaneus amazonus* Zimmer, 1936	Adjective	*Pachyramphus* [M] *castaneus amazonus*
Sittasomus [M] *amazonus* de Lafresnaye, 1850	Adjective	*Sittasomus* [M] *griseicapillus amazonus*
Terenotriccus [M] *erythrurus amazonus* Zimmer, 1939	Adjective	*Terenotriccus* [M] *erythrurus amazonus*
Ateleodacnis [F] *speciosa amazonum* Hellmayr, 1917	Noun	*Conirostrum* [N] *speciosum amazonum*
Heteropelma [N] *amazonum* P. L. Sclater, 1860	Noun	*Schiffornis* [F] *turdina amazona* [should be ***amazonum***]
Pyrrhura [F] *picta amazonum* Hellmayr, 1906	Noun	*Pyrrhura* [F] *picta amazonum*
Ramphocaenus [M] *melanurus amazonum* Hellmayr, 1907	Noun	*Ramphocaenus* [M] *melanurus amazonum*
Urogalba [F] *amazonum* P. L. Sclater, 1855	Noun	*Galbula* [F] *dea amazonum*

TABLE 6
Status of original species-group names established by Smith (1836, 1838–49).

Original combination	Status	Current combination (Dickinson 2003)
Mirafra [F] *cheniana* A. Smith, 1843	Noun	*Mirafra* [F] *cheniana*
Drymoica [F] *chiniana* A. Smith, 1843	Noun	*Cisticola* [M] *chiniana*
Drymoica [F] *cherina* A. Smith, 1843	Noun	*Cisticola* [M] *cherina*
Alauda [F] *chuana* A. Smith, 1836	Noun	*Certhilauda* [F] *chuana*
Ortygis [M][1] *Lepurana* A. Smith, 1836	Noun	*Turnix* [M] *sylvaticus lepuranus* [should be ***lepurana***]
Merula [F] *Libonyana* A. Smith, 1836	Noun	*Turdus* [M] *libonyanus* [should be ***libonyana***]

[1] Although *Ortygis* is masculine according to the ICZN (1999) Code, it was sometimes treated as feminine in the past.

Six names established by Andrew Smith

Smith (1836) established *Ortygis lepurana, Alauda chuana* and *Merula libonyana*. In his work (p. 57), he writes 'The names given by the Natives to the objects above described, I have adopted as the trivial ones...', thus indicating that they are nouns in apposition. Smith (1838–49) subsequently confirmed this treatment by using the combinations *Hemipodius lepurana* and *Turdus libonyana*. He also established the names *Drymoica cherina, Drymoica chiniana* and *Mirafra cheniana* (Smith 1838–1849). As there is not the slightest indication in his work for considering these names as possibly adjectival (let alone solely adjectival), they must be taken as nouns in apposition (Table 6). Consequently:

Ortygis Lepurana A. Smith, 1836, in which *lepurana* has to be taken as a noun in apposition, must be spelled *Turnix sylvaticus* ***lepurana***.

Merula Libonyana A. Smith, 1836, in which *libonyana* has to be taken as a noun in apposition, must be spelled *Turdus* ***libonyana***.

The species-group name *serinus*

The name *serinus* is Latinized from the French noun 'serin', which dates back to 1478 (*Trésor de la langue française* 1971–94) and has been used in English since 1530 (Little *et al.* 1973). When establishing *Fringilla* [F] *Serinus*, Linnaeus (1766: 320) cited the generic name *Serinus* of Gessner, Aldrovandi, Brisson, Willughby and Ray. There is therefore no doubt that Linnaeus used *serinus* as a noun in apposition.

TABLE 7
Status of the species-group names *garrulus* and *garrula*.

Original combination	Status	Current combination (Dickinson 2003)
Coracias [M][1] *Garrulus* Linnaeus, 1758	Noun	*Coracias* [M] *garrulus*
Lanius [M] *Garrulus* Linnaeus, 1758	Noun	*Bombycilla* [F] *garrulus*
Psittacus [M] *garrulus* Linnaeus, 1758	Adjective	*Lorius* [M] *garrulus*
Phasianus [M] *garrulus* von Humboldt, 1805	Adjective	*Ortalis* [F] *garrula*
Certhilauda [F] *garrula* A. Smith, 1846	Adjective	*Chersomanes* [F] *albofasciata garrula*

In the original description of *Criniger* [M] *serinus* J. & E. Verreaux, 1855, there is no indication that *serinus* was used adjectivally. Therefore, it is a noun in apposition, the default conclusion of the ICZN Code (1999) in the case of non-existent or conflicting evidence. Consequently:

Criniger serinus J. & E. Verreaux, 1855, in which *serinus* has to be taken as a noun in apposition, must be spelled *Calyptocichla* ***seriinus***.

The species-group names *garrulus* and *garrula*

Garrulus is a classical Latin adjective, but when Linnaeus (1758) used the combination *Coracias Garrulus*, he based it on the pre-Linnaean generic name of the *Garrulus argentoratensis* of Ray and Edwards. Both this indication and Linnaeus' use of the masculine word *Garrulus* (note the upper case) in combination with the feminine genus *Coracias*[1] indicate that he regarded *Garrulus* as a noun.

Similarly, Linnaeus' *Lanius Garrulus* (note the upper case) was also based on a pre-Linnaean generic name, *Garrulus bohemicus* of Gessner, Aldrovandi, Willughby, Ray, Albin and Frisch (see also David & Gosselin 2000). See Table 7.

Some Linnaean and post-Linnaean geographical names

This group consists of 40 geographical names (toponyms) that have been treated in various ways over the years (Table 8). Thirty-one were established by Linnaeus, seven by his immediate successors (Statius Müller, Hermann, Latham, Cuvier), and two by modern authors (Lynes, Zimmer & W. H. Phelps). Many of these names are problematic because the same word (e.g. *Cayana*, *Dominica*) was sometimes used as both a place name and a geographical adjective. A simplistic approach would be to regard as adjectives the species-group names where Linnaeus used a lower case initial, an 'indication' that he considered them adjectives (Parkes 1982). However, a closer look has shown that occasionally some of these words are not adjectival (David & Gosselin 2000).

Pre-Linnaean generic names

bengalus and *canaria*.—Two species names introduced by Linnaeus, *Fringilla bengalus* Linnaeus, 1766, and *Fringilla Canaria* Linnaeus, 1758, may look like geographical adjectives at first, but are in fact generic bird names quoted by Linnaeus from previous authors (Brisson, Gessner, Aldrovandi). *Canaria* has the capital initial letter generally used by Linnaeus for nouns, while *bengalus* does not agree in gender with *Fringilla*, two supplementary

[1] *Coracias* was treated as feminine by Linnaeus (1758) but it is now masculine because of an ICZN Ruling (Hemming 1956).

TABLE 8
Status of some Linnaean and post-Linnaean geographical species-group names.

Original combination	Status	Current combination (Dickinson 2003)
Fringilla [F] *bengalus* Linnaeus, 1766	Noun	*Uraeginthus* [M] *bengalus*
Fringilla [F] *Canaria* Linnaeus, 1758	Noun	*Serinus* [M] *canaria*
Cisticola [M][1] *ruficeps guinea* Lynes, 1930	Noun	*Cisticola* [M] *ruficeps guinea*
Columba [F] *guinea* Linnaeus, 1766	Noun	*Columba* [F] *guinea*
Fringilla [F] *jamaica* Linnaeus, 1766	Noun	*Euphonia* [F] *jamaica*
Loxia [F] *malacca* Linnaeus, 1766	Noun	*Lonchura* [F] *malacca*
Tanagra [F] *bresilia* Linnaeus, 1766	Adjective	*Ramphocelus* [M] *bresilius*
Fulica [F] *Cajanea* Statius Müller, 1776	Adjective	*Aramides* [M] *cajanea* [should be ***cajaneus***]
Picus [M] *carolinus* Linnaeus, 1758	Adjective	*Melanerpes* [M] *carolinus*
Rallus [M] *carolinus* Linnaeus, 1758	Adjective	*Porzana* [F] *carolina*
Turdus [M] *Carolinus* Statius Müller, 1776	Adjective	*Euphagus* [M] *carolinus*
Ampelis [F] *cayana* Linnaeus, 1766	Adjective	*Cotinga* [F] *cayana*
Motacilla [F] *cayana* Linnaeus, 1766	Adjective	*Dacnis* [F] *cayana*
Tanagra [F] *cayana* Linnaeus, 1766	Adjective	*Tangara* [F] *cayana*
Charadrius [M] *cayanus* Latham, 1790	Adjective	*Vanellus* [M] *cayanus*
Corvus [M] *cayanus* Linnaeus, 1766	Adjective	*Cyanocorax* [M] *cayanus*
Cuculus [M] *cayanus* Linnaeus, 1766	Adjective	*Piaya* [F] *cayana*
Lanius [M] *cayanus* Linnaeus, 1766	Adjective	*Tityra* [F] *cayana*
Anas [F] *dominica* Linnaeus, 1766	Adjective	*Nomonyx* [M] *dominicus*
Motacilla [F] *dominica* Linnaeus, 1766	Adjective	*Dendroica* [F] *dominica*
Tanagra [F] *dominica* Linnaeus, 1766	Adjective	*Dulus* [M] *dominicus*
Colymbus [M] *dominicus* Linnaeus, 1766	Adjective	*Tachybaptus* [M] *dominicus*
Trochilus [M] *dominicus* Linnaeus, 1766	Adjective	*Anthracothorax* [M] *dominicus*
Charadrius [M] *Dominicus* Statius Müller, 1776	Adjective	*Pluvialis* [F] *dominica*
Turdus [M] *Guajanus* Statius Müller, 1776	Adjective	*Pitta* [F] *guajana*
Columba [F] *martinica* Linnaeus, 1766	Adjective	*Geotrygon* [F] *montana martinica*
Fulica [F] *martinica* Linnaeus, 1766	Adjective	*Porphyrio* [M] *martinica* [should be ***martinicus***]
Muscicapa [F] *martinica* Linnaeus, 1766	Adjective	*Elaenia* [F] *martinica*
Hirundo [F] *martinica* Hermann, 1783	Adjective	*Chaetura* [F] *martinica*
Loxia [F] *molucca* Linnaeus, 1766	Adjective	*Lonchura* [F] *molucca*
Ibis [F] *molucca* Cuvier, 1829	Adjective	*Threskiornis* [M] *molucca* [should be ***moluccus***]
Fringilla [F] *Senegala* Linnaeus, 1766	Adjective	*Lagonosticta* [F] *senegala*
Parra [F] *senegalla* Linnaeus, 1766	Adjective	*Vanellus* [M] *senegallus*
Lanius [M] *Senegalus* Linnaeus, 1766	Adjective	*Tchagra* [M] *senegalus*
Psittacus [M] *Senegalus* Linnaeus, 1766	Adjective	*Poicephalus* [M] *senegalus*
Tetrao [M] *senegallus* Linnaeus, 1771	Adjective	*Pterocles* [M] *senegallus*
Aratinga [F] *pertinax surinama* Zimmer & W. H. Phelps, 1951	Adjective	*Aratinga* [F] *pertinax surinama*
Muscicapa [F] *surinama* Linnaeus, 1766	Adjective	*Pachyramphus* [M] *surinamus*
Turdus [M] *surinamus* Linnaeus, 1766	Adjective	*Tachyphonus* [M] *surinamus*
Turdus [M] *zeylonus* Linnaeus, 1766	Adjective	*Telophorus* [M] *zeylonus*

[1] *Cisticola* was treated as feminine by Lynes (1930) but it is now masculine according to the ICZN (1999) Code.

indications that we are indeed dealing with nouns in apposition, the default conclusion of the ICZN Code (1999) in the case of non-existent or conflicting evidence.

Unmodified place names

guinea.—In *Columba guinea* Linnaeus, 1758, the author used an unmodified modern place name (*cf.* '*Habitat in* Guinea' in Linnaeus' account (p. 175) of *Loxia melanocephala*). Contrarily to *guineensis* (e.g. in *Ovis guineensis* Linnaeus, 1758), there is no adjectival suffix in *guinea*, which is the English place name used by Albin and Edwards when they originally reported the species. Guinea is derived from the vernacular African word 'Aguinaw' (Encyclopaedia Britannica 2010). The same conclusion applies to *Cisticola ruficeps guinea* Lynes, 1930.

jamaica.—When Linnaeus (1766) established *Fringilla jamaica*, he used an unmodified modern place name (*cf.* '*Habitat in* Jamaica') instead of an adjectival form (as in *Columba jamaicensis* Linnaeus, 1766). There is no adjectival suffix in the word *jamaica*, which is the English place name used by Sloane when he originally reported the species. Jamaica is derived from the Arawak word 'Xaymaca' (Encyclopaedia Britannica 2010).

malacca.—For *Loxia malacca* Linnaeus, 1766, the internal evidence ('*Habitat in* ... Malacca'), together with the fact that Linnaeus coined the adjectival *malaccensis* elsewhere in his work (p. 75), indicate a modern place name for this word. There is no adjectival suffix in the word *malacca*, which is the French (and Latin) place name used by Seba (1734), the source for *Erinaceus malaccensis* Linnaeus, 1766. The place name Malacca is apparently derived from the Malay tree name 'melaka' (Bosworth 2007).

Properly formed adjectives

bresilia.—The *Tanagra bresilia* of Linnaeus (1766) was founded in great part on the *Merula bresilica* of previous authors, and based on the 'Merle de bresil' of Belon (1555: 319). The *bresilia* of Linnaeus is thus a variant of *bresilica*, with a different adjectival ending (*–ia* instead of *–ica* (Woods 1944)) added to the word 'bresil'. '*Bresilia*' is nowhere used as a place name by Linnaeus.

cajanea.—This word, in Statius Müller (1776), is a geographical adjective based on the Latinized root of Statius Müller's place name 'Cajenne', with the addition of the adjectival suffix *–eus, –ea* (Woods 1944). This interpretation is confirmed by the matching German name ('Das cajennische Wasserhuhn *Fulica Cajanea*') and the clearly adjectival use of the same word elsewhere in the work ('Die cajennische Merle *Turdus Cajaneus*'). Statius Müller (1776) used capital initial letters for all of his species-group names, so this fact has no special significance here.

surinamus, –a.—In *Muscicapa surinama* Linnaeus, 1766, and *Turdus surinamus* Linnaeus, 1766, the species-group name is a Latinized geographical adjective, derived from the place name 'Suriname' (*cf.* '*Habitat* Surinami' [ablative]) or 'Surinam' (*cf.* 'Merle de Surinam' in Brisson (1760), the basis for Linnaeus' *Turdus surinamus*). Linnaeus used the adjectival *surinamus, –a* in proper gender agreement with the matching genera. Since Suriname ends in a mute 'e', an adjectival suffix *–us, –a* after a consonant is an appropriate interpretation of *surinamus, –a* (*cf.* Woods 1944). *Aratinga pertinax surinama* Zimmer & W. H. Phelps, 1951, is based on the cited place name 'Surinam', again with the adjectival suffix *–us, –a* after a consonant.

Adjectives resembling Latinized place names

carolinus.—As used by Linnaeus (1758) and Statius Müller (1776), *carolinus* is a Latin adjective, coined on the same pattern and with the same etymology as the modern place name 'Carolina'.

cayanus, –a.—As used by Linnaeus (1766), this is a geographical adjective and, like the Latinized place names 'Cayana' and 'Cayania', it is derived from the French place name 'Cayenne' (of Brisson 1760, the source for Linnaeus' names). Linnaeus used the adjectival *cayanus, –a* in proper gender agreement with the matching genera. Since Cayenne ends in a mute 'e', an adjectival suffix *–us, –a* after a consonant is an appropriate interpretation of *cayanus, –a* (*cf.* Woods 1944).

dominicus, –a.—This word is a Latin adjective. When Linnaeus (1766) created *Tanagra dominica* and *Motacilla dominica,* he surprisingly referred to 'Dominica' as a place name ('*Habitat in* Dominica'). However, this is an idiosyncratic application because the locality he referred to (and which his source (Brisson 1760) called 'Dominicensi Insula') has been universally known as 'Saint-Domingue' or 'Santo Domingo'. The 'Dominica' of Linnaeus is thus an abbreviated place name that has no link with present-day Dominica. We conclude that Linnaeus' usage of *dominica* in *Tanagra* and *Motacilla* is indeed adjectival, since *dominicus* is an adjective used elsewhere by Linnaeus (1766) in a similar context (*cf. Colymbus dominicus, Trochilus dominicus, Turdus dominicus*).

guajanus.—As used by Statius Müller (1776), this is a geographical adjective, and like the Latinized place name 'Guajana', it is derived from the French name 'Guiane' (of Buffon, *cf.* Mayr 1979). Statius Müller's proper gender agreement for this word, and the fact that Guiane (like Cayenne) ends in a mute 'e', sanctions the presence of the suffix *–us, –a* after a consonant as an appropriate interpretation of *guajanus* (Woods 1944). Statius Müller (1776) used capital initial letters for all of his species-group names, so this fact has no special significance here.

martinica.—As used by Linnaeus (1766), this is a geographical adjective, and like the Latinized place name 'Martinica', it is derived from the French name 'Martinique' (of Brisson 1760, the source of Linnaeus' name). Linnaeus' proper gender agreement for this word, and the fact that Martinique (like Cayenne and Guiane) ends in a mute 'e', sanctions the presence of the suffix *–us, –a* after a consonant as an appropriate interpretation of *martinica* (Woods 1944).

molucca.—In *Loxia molucca* Linnaeus, 1766, *molucca,* like the Latinized place name 'Moluccae' (*cf.* '*Habitat in* ... Moluccis' [ablative]) and similar words in many languages, is derived from the Arabic root 'Muluk' (Gray 1887). Here again, the Latin adjectival suffix *–us, –a* after a consonant is an appropriate interpretation of *molucca* (Woods 1944). *Ibis molucca* Cuvier, 1829, is similar and is therefore also adjectival. Mees (1982) treated Cuvier's *molucca* as adjectival, but Sibley & Monroe (1990: 313) and Andrew (1992: 45) proposed, without explanation, that the name was a noun in apposition.

zeylonus.—This geographical adjective, like the Latinized place name 'Zeylona', is derived from a Germanic form of the word Ceylan (Zeylon), with the adjectival suffix *–us, –a* after a consonant (Woods 1944).

Senegallus, –a *and* senegalus, –a

senegallus, –a.—This word is used by Linnaeus (1766, 1771) as a geographical adjective derived from the Latinized place name 'Senegallia' (*cf.* '*Habitat in* ... Senegallia') in the same way as the classical noun / adjective *gallus, –a* is derived from '*Gallia*' (Gaul). Linnaeus used lower case initial letters for *senegallus, –a,* contrarily to *Senegalus, –a* (see below).

senegalus, –a.—This adjective is derived from the place name 'Senegal' (*cf.* '*Habitat in* ... Senegal') with the addition of the adjectival suffix *–us, –a* after a consonant (Woods 1944). For unstated reasons, Linnaeus (1766) used capital initial letters for this word. For *Fringilla Senegala* Linnaeus, 1766, he quoted Brisson's (1760) generic name '*Senegallus*' (actually spelled *Senegalus* by Brisson) as a source for the taxon, yet he modified the word and its

ending to match the gender of *Fringilla*. The species-group names *Senegalus* and *Senegala* of Linnaeus are to be treated as adjectives because of their grammatical properties and because Linnaeus modified each of them to agree in gender with its matching generic name.

Given the above, three spellings of geographical names need to be modified:

Fulica Cajanea Statius Müller, 1776 must be spelled *Aramides* ***cajaneus*** (*contra* David & Gosselin 2002b: 276).

Ibis molucca Cuvier, 1829 must be spelled *Threskiornis* ***moluccus***.

Fulica martinica Linnaeus, 1766 must be spelled *Porphyrio* ***martinicus***.

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Nomenclature of the Laysan Honeycreeper *Himatione [sanguinea] fraithii*

by Peter Pyle

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The Apapane *Himatione sanguinea* is the most abundant extant species of Hawaiian finch (Fringillidae, Drepanidinae) (Pratt 2005, Pyle & Pyle 2009). It occurs throughout high islands of the south-east Hawaiian Islands, where it shows little to no inter-island variation. On Laysan Island, Northwestern Hawaiian Islands, a resident *Himatione* was first encountered on 3 April 1828 by the naturalist C. Isenbeck (von Kittlitz 1834) and named much later from specimens collected by H. Palmer and G. Munro in June 1891 (Rothschild 1892). While Palmer and Munro were on Laysan they were assisted by George D. Freeth, manager of a guano-mining operation there and an amateur naturalist. In acknowledgement, Rothschild named the new bird *Himatione fraithii*, based evidently on a miscommunication from Palmer or Munro or an erroneous assumption concerning the spelling of Freeth's name, which is not mentioned in the description. This taxon, widely known as the Laysan Honeyeater and, later, the Laysan Honeycreeper, became extinct in 1923 (Ely & Clapp 1975, A. Wetmore *in* Olson 1996).

Walter Rothschild was a well-known British zoologist with an avid interest in the birdlife of islands (Rothschild 1983, Olson 2008). He had sent Palmer and other collectors to procure specimens from the Hawaiian Islands in 1890–93 for his private museum in Tring, England. Based upon this collection he published *Avifauna of Laysan and the neighbouring islands, with a complete history to date of the birds of the Hawaiian possession* in three parts, Part I in August 1893, Part II in November 1893 and Part III in December 1900 (Rothschild 1893–1900; see Olson 2003). By publication of Part I, Rothschild recognised that he had previously misspelled Freeth's name and emended the specific name of the Laysan Honeyeater to *freethi* (pp. *v*, *x* and 3), but by publication of Part III he had returned, in part, to *fraithi* (pp. *xvii*, *xix*, 131, 305) and also used a fourth spelling, *freethii*, on Plate 82 showing morphology of bird beaks.

Although each of the four above names, *fraithii*, *freethi*, *fraithi* and *freethii*, have been used multiple times for the Laysan Honeyeater (see synonymies in Pyle & Pyle 2009), since the original description only Hartert (1919) and Bryan & Greenway (1944) have used *fraithii*. All other authors since 1944, including the AOU (1998) have used *freethii* or *freethi*. The taxon was considered a full species until Hartert (1919) demoted it to a subspecies of Apapane, an opinion followed by most taxonomists through the 1900s (including AOU 1998). Based on osteological evidence, Olson & James (1982) proposed it as a full species, and this was followed by Pratt & Pratt (2001), James (2004) and Pratt (2005) based on this and other evidence.

Amadon (1950) and Pratt (2005) justified the use of *freethii* by regarding *fraithii* as a *lapsus calami* that Rothschild had 'corrected,' in the same publication according to Pratt, as permitted by the rules of nomenclature (ICZN 1999, Art. 32.5.1.1). This is incorrect, however, as the original description was published in July 1892 in the *Annals and Magazine of Natural History* (Rothschild 1892) and the emendation was not made until August 1893 in Part I of Rothschild's (1893–1900) monograph. Furthermore, Rothschild seemed to have realised that changing his original spelling was inappropriate, as he reverted to *fraithi* in Part III of his monograph (1900). Because change of the original spelling is unjustified, and

the use of either *fraithii* or *fraithi* would be admissible, the original spelling should not be emended (ICZN 1999, Arts. 31.1.2 and 33.4), and *fraithii* should be retained as the correct name for the Laysan Honeyeater.

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First confirmed record and first breeding record of Indian Spotted Eagle *Aquila hastata* in Indochina

by Markus Handschuh, Robert N. van Zalinge, Urban Olsson, Phok Samphos, Hong Chamnan & Tom D. Evans

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Indian Spotted Eagle *Aquila hastata* was long treated as a subspecies of Lesser Spotted Eagle *A. pomarina* (e.g. Grimmett *et al.* 1998). However, Parry *et al.* (2002) made the now widely accepted case for recognising resident populations of *A. pomarina* in the Indian subcontinent specifically, *A. hastata*, which was subsequently corroborated by a phylogenetic analysis based on mitochondrial DNA sequences (Väli 2006).

To date only Greater Spotted Eagle *A. clanga* has been confirmed in Cambodia, but *A. hastata* has been suspected to occur. Greater Spotted Eagle breeds from Eastern Europe to eastern Russia and is a regular winter visitor to Cambodia (Thomas & Poole 2003, Robson 2008). Birds similar to Indian Spotted Eagle were seen and photographed in Cambodia in 2003 (Goes & Davidson 2003) and on several occasions since (J. C. Eames, J. Eaton, J. Pilgrim, P. Round, H. Wright *et al.* pers. comm.), but due in part to doubt over the field identification, none of the observations has been published in a scientific journal.

In mid-June 2009, a darkish eagle in juvenile plumage with fully feathered tarsi was found, with clipped wing feathers, in Thnal village, Prasat Balang District, Kampong Thom Province, Cambodia (12°59′10″N, 104°56′47″E). According to the villagers who kept the eagle, it had been collected as a chick from a nest in deciduous forest nearby, in May 2008. We immediately identified the bird as a 'spotted eagle' as it had rounded nostrils and extensive whitish spotting on the crown, scapulars and wing-coverts, but the specific identity was harder to establish due to the morphological similarities between spotted eagles. The bird was handed to officials of the Forestry Administration and subsequently transferred to the Angkor Centre for Conservation of Biodiversity (a wildlife rescue centre). For species confirmation, morphological features were examined and DNA testing undertaken (the latter also for sex determination). The bird was not suitable for release and at the time of writing remains alive at the centre.

Methods

Plumage features were examined and selected biometrics of the captive bird were taken in August 2010 using callipers (for culmen chord from tip of bill to skull, mandibular symphysis length, gape length, and gape breadth including the fleshy flange) and a zero-stop wing rule (for maximum tarso-metatarsus length). These features were compared with Forsman (1991), Parry *et al.* (2002) and Rasmussen & Anderton (2005).

DNA was extracted from a sample of breast feathers, using QIA Quick DNEasy Kit (Qiagen Inc., Hilden, Germany) according to the manufacturer's instructions, but with 30 µl DTT added to the initial incubation step. Amplification and sequencing followed the protocols described in Olsson *et al.* (2005). Reference sequences for the following eight eagle taxa were obtained from GenBank: *Aquila rapax vindhiana*, *A.* [*pomarina*] *pomarina*, *A.* [*p.*] *hastata*, *A. clanga*, *A. heliaca heliaca*, *A. nipalensis nipalensis*, *A. chrysaetos daphanea* and *Spizaetus cirrhatus* (= *Nisaetus cirrhatus*). Sequences were aligned using MegAlign 4.03 in the DNAstar package (DNAstar Inc., Madison, WI, USA). We performed both an exhaustive search and bootstrapping in PAUP* (Swofford 2001). The settings for the parsimony bootstrap were

heuristic search strategy, 10,000 replicates, starting trees obtained by stepwise addition (random addition sequence, ten replicates), TBR branch swapping, MulTrees option not in effect (only one tree saved per replicate).

Results

Plumage.—Greater Spotted Eagle was excluded by the generally dull brown rather than blackish-brown or dark rufous-brown plumage both above and below, the pronounced dark-barred flight feathers, and the overall less pronounced pale spotting above (Forsman 1991, Rasmussen & Anderton 2005). The Cambodian bird showed all of the five plumage features listed by Parry *et al.* (2002) that distinguish juveniles of Indian Spotted Eagle from Lesser Spotted: no rufous nape patch; spots only on tips of upperwing-coverts, not on shafts; tertials pale brown with diffuse white tips; uppertail-coverts very pale brown with

Figure 1. Underside of the captive female Indian Spotted Eagle *A. hastata* in Cambodia. Note the dull brown rather than blackish-brown or dark rufous-brown plumage, and the pronounced dark-barred flight feathers below that distinguish it from juvenile Greater Spotted Eagle *A. clanga*. At the time (March 2010), the bird had already moulted most body feathers below (Markus Handschuh / Angkor Centre for Conservation of Biodiversity)

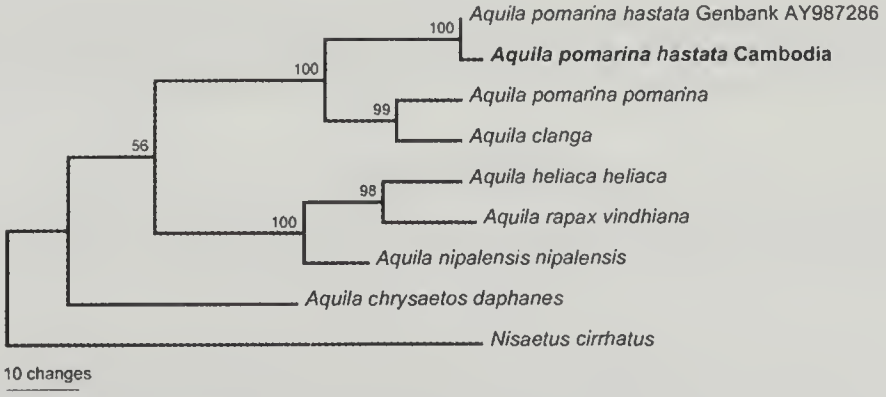

Figure 2. Phylogram of the most parsimonious tree. Bootstrap support values are given above the branches. All relevant nodes receive strong support.

white barring; and underparts pale yellowish brown with darker streaks. Fig. 1 illustrates some of these features.

Biometrics.—Table 1 shows selected biometrics of the Cambodian bird compared to museum specimens measured by Parry *et al.* (2002). Using DNA sexing, the sex was found to be female. Three of five measurements match the biometrics of specimens of Indian Spotted Eagle. However, three of five measurements fall outside the range for female Indian Spotted Eagle as follows. (1) Gape length was below the 95% confidence range for female Indian Spotted Eagle, but within the range for male Indian Spotted and outside the ranges for Lesser Spotted and Greater Spotted. (2) Gape breadth was above the ranges for all species, but is only 0.8 mm above the 95% confidence range given for female Indian Spotted Eagle; and (3) tarso-metatarsus length falls above the ranges given for Indian Spotted and Lesser Spotted, but within the 95% confidence range for Greater Spotted Eagle.

TABLE 1

Biometrics of the Cambodian spotted eagle compared with biometrics of museum specimens taken from Parry *et al.* (2002). All measurements are in mm. For the captive bird, callipers were used to measure culmen chord (from tip of bill to skull), mandibular symphysis length, gape length, and gape breadth (including the fleshy 'lips'); tarso-metatarsus length was measured as maximum length using a zero-stop wing rule. Parry *et al.* (2002) did not present absolute minimum and maximum values or details of the measuring techniques used.

		95% confidence interval for measurements by Parry *et al.* (2002)					
	Captive female (this study)	Indian Spotted male	**Indian Spotted female**	Lesser Spotted male	Lesser Spotted female	Greater Spotted male	Greater Spotted female
Culmen chord	**45.1**	42.1–43.8	**43.4–45.7**	39.7–42.9	42.1–44.1	45.0–47.3	49.4–51.3
Mandibular symphysis length	**14.4**	13.0–13.7	**13.7–14.7**	14.4–15.8	15.4–16.4	15.6–16.7	17.1–18.0
Gape length	**57.9**	**56.3–59.5**	58.8–61.4	48.4–52.2	51.2–53.4	55.0–57.7	59.4–61.4
Gape breadth	**49.5**	45.2–47.0	46.2–48.7	35.2–38.6	36.3–38.4	39.5–42.1	42.0–43.9
Tarso-metatarsus length	**105.0**	93.9–98.0	94.2–99.5	90.5–97.7	93.8–98.4	101.8–107.2	103.5–107.5

Genetics.—For species confirmation, we obtained a contiguous 1,041 base pair portion of the cytochrome-*b* gene from the captive eagle. The aligned cytochrome-*b* sequences contain 1,038 characters, of which 105 (10%) are parsimony informative. The exhaustive search resulted in a single most parsimonious tree (Fig. 2), which is congruent with Helbig *et al.* (2005), Lerner & Mindell (2005) and Väli (2006). The sequence is most similar to the published sequence of *A.* [*p.*] *hastata* (specimen UMMZ 78272, male, collected on 1 May 1933 by W. N. Koelz at Bhadwar, Kangra District Himachal Pradesh, India) from which it differs by 0.3% (uncorrected *p*). This is clearly within the range of normal intraspecific variation. Differences between the GenBank reference sample for *hastata* and those of both *A.* [*p.*] *pomarina* and *A. clanga* were 4%. Differences between *A.* [*p.*] *pomarina* and *A. clanga* were 1.7%.

Discussion

On plumage and genetics, as well as several biometrics, in particular the striking bill morphology with an unusually broad gape, the Cambodian bird matches Indian Spotted Eagle more closely than any other species, making this the first confirmed record for Cambodia and Indochina. Differences were noted from published descriptions in respect of gape length and breadth, and tarso-metatarsus length. The longer tarsus and in particular the slightly broader gape, which included the fleshy flange in the Cambodian bird, are

probably explained by the well-documented post-mortem shrinkage in museum specimens (e.g. Winker 1993); all three biometric differences may also be due to individual variation and potential differences in measuring techniques. Parry *et al.* (2002) do not give absolute maximum and minimum values for these taxa, or details of how the measurements were taken. Review of a larger number of Cambodian individuals should be undertaken to look for potential subspecific differences, and this need is supported by unconfirmed reports from the field of consistent plumage differences between Cambodian and Indian populations. To complement this, the sequence of immature plumages of the captive bird is being recorded as it matures.

Indian Spotted Eagle is an uncommon and local resident in India and southern Nepal, with records from south-west and south Myanmar, which are thought perhaps to be of winter migrants (Rasmussen & Anderton 2005, Robson 2008). It is considered extinct in Bangladesh (Robson 2008). The Cambodian record reported here extends the breeding range by *c.*2,000 km. Indian Spotted Eagle should be sought in extensive tracts of open lowland deciduous dipterocarp forests in intervening areas of Myanmar and Thailand, and in southern Vietnam and southern Laos. A reassessment of specimens and photographs of *Aquila* eagles from these areas might also reveal previously overlooked records of Indian Spotted Eagle.

This record suggests that at least some, if not all, of the suspected Indian Spotted Eagles recorded in Cambodia by various observers since 2003 were probably correct. A detailed collaborative review of past records of *Aquila* eagles in Cambodia is underway, as is an analysis of plumage features of Indian Spotted Eagles in Cambodia and the field identification of this population. To facilitate this, MH would be grateful to receive previously unpublished records of *Aquila* eagles from Cambodia or adjacent areas. Reports of Indian Spotted Eagle have come from several localities in deciduous dipterocarp forest in Preah Vihear and Stung Treng provinces (J. Eames, J. Eaton, J. Pilgrim, P. Round, H. Wright *et al.* pers. comm.) and include displaying birds (P. Round pers. comm.), suggesting the presence of a significant breeding population of *A. hastata* in Cambodia. There are also records of Greater Spotted Eagle from the same areas and habitats, both historical (Delacour 1929) and recent (Goes & Davidson 2003, Robson 2008), indicating the need for great caution in identifying spotted eagles (and indeed any *Aquila* eagle) in Indochina.

Indian Spotted Eagle appears to occur at very low densities throughout its range and is largely restricted to lowland deciduous dipterocarp forests. The species is currently considered globally Vulnerable to extinction (BirdLife International 2010). Cambodia is one of the few countries in tropical Asia where large tracts of suitable forest remain, and significant opportunities for the conservation of this species may exist there. However, as elsewhere, land use is changing rapidly: for example, the nest site from where the Cambodian juvenile had been taken has since been deforested for a paper pulp plantation. Indian Spotted Eagle may occur regularly within some of Cambodia's protected areas and nest surveys are planned in areas from which convincing sight records are available.

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The type locality of the Olive Warbler (Peucedramidae)

by Richard C. Banks

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Lowery & Monroe (1968: 78) correctly stated that the original type locality (Mexique = Mexico) of *Sylvia taeniata* Du Bus, 1847 (now *Peucedramus taeniatus*) was restricted to San Cristóbal, Chiapas, by Brodkorb (1944). But, they added that Zimmer (1948a) had shown that the type probably came from San Pedro, Oaxaca. Perhaps they intended the latter statement to be accepted as a correction to Brodkorb's designation, but it seems instead to have resulted in uncertainty and taxonomic confusion (Lowther & Nocedal 1997, Curson 2010). The two suggested type localities are on opposite sides of the Isthmus of Tehuantepec, which may (or may not) be the boundary of subspecific populations, one of which would be the nominate subspecies.

Hellmayr (1935: 360) may have been the first to restrict the type locality of *Sylvia taeniata* Du Bus, in the synonymy of *Peucedramus olivaceus* (Giraud, 1841), suggesting that 'Mexique' was 'probably the state of Vera Cruz, where some of the other new Mexican birds described by Du Bus came from.' Information in van Rossem (1942) shows that cannot be correct.

Van Rossem (1942) examined the type specimens of both *Cyanocorax unicolor* and *Sylvia taeniata* of Du Bus (1847) in the Brussels museum in 1939. Both specimens were collected by

Auguste Ghiesbreght, supposedly in Tabasco, Mexico, with a specimen of *Turdus rufitorques*. Hellmayr (1934) had previously pointed out that Tabasco was an unlikely locality for the montane *Cyanocorax*, and van Rossem (1942) cited evidence from P. Brodkorb and E. A. Goldman that there are no mountains in Tabasco high enough to accommodate these species. The assumption was that Ghiesbreght had gone from Tabasco into neighbouring Chiapas, perhaps without being aware of it. Van Rossem (1942) indicted that 'it is certain that Chiapas, not Tabasco, is the type region of both the above birds [*C. unicolor* and *S. taeniata*] . . . ' and 'a spot as close as possible to the Tabasco boundary should be selected . . . ' but left the definite selection to Brodkorb 'in view of his extensive work in Chiapas.'

Relative to *Sylvia taeniata*, van Rossem (1942) stated: 'Incidentally, Bonaparte's statement (Consp. Gen. Avium, 1, 1850: 309) that the subsequent plate (Esq. Orn. Livr. 6, 1850: pl. 28) was from a specimen from San Pedro, Oaxaca, is not correct. The type is the basis of the plate and I may add that Wilhelm Meise made a similar notation on the tag in 1938.'

Brodkorb (1944) expanded on van Rossem's comments and noted that Chiapas is the only Mexican state in which the three species (*Cyanocorax unicolor*, *Turdus rufitorques* and *Sylvia taeniata*) attributed to Tabasco by Du Bus occur. He restricted the type locality of *C. unicolor* [now *Aphelocoma unicolor*] 'to San Cristóbal, or as it is now called Ciudad de Las Casas, since this, the largest town in Chiapas, is the locality nearest Tabasco from which the species has been reported.' He further stated: 'For the reasons given under *Cyanocorax unicolor*, I restrict the type locality of *S. taeniata* to San Cristóbal, Chiapas.'

Zimmer (1948a) established that *Sylvia taeniata* of Du Bus was the name properly applied to the Olive Warbler, the name formerly in use (*Sylvia olivacea* Giraud) being preoccupied. Without mentioning Brodkorb's paper of 1944, Zimmer (1948a) attempted to fix the type locality of *S. taeniata* Du Bus or, more precisely, to determine to which named subspecies it applied. At his request, R. Verheyen of the Brussels museum and J. Delacour examined the type specimen. Zimmer (1948a) wrote: 'It is an old mounted bird and greatly faded, and in its present condition agrees best, according to Captain Delacour, with *jaliscensis*. If allowance is made, however, for considerable fading that must have taken place during the last century, I believe that assignment to *aurantiacus* is more strongly indicated.' Citing the Bonaparte (1850) work that van Rossem (1942) had discredited, Zimmer placed the type locality of *taeniata* at an indefinite San Pedro, Oaxaca. Zimmer did not indicate whose subspecific treatment he was following. The most recently preceding was that of Hellmayr (1935), who did not recognise *jaliscensis*, and he may have been following Miller & Griscom (1925), who saw no Oaxaca specimens and who did not mention that state in the range of any subspecies. Hellmayr (1935) included at least part of Oaxaca in the range of then nominate *olivacea* (which Zimmer renamed *giraudi*); *aurantiacus* was found in Guatemala (Miller & Griscom 1925) or Guatemala and Chiapas (Hellmayr 1935). Zimmer's placement of the type locality of *Sylvia taeniata* Du Bus in Oaxaca and his subspecific allotment of the type specimen to a subspecies found in Chiapas and Guatemala are seemingly incompatible.

Van Rossem (1948) pointed out that Zimmer (1948a) had overlooked earlier statements by himself (1942) and Brodkorb (1944). Zimmer (1948b) disputed van Rossem's (1942) claim that Bonaparte (1850) was wrong, and continued to follow Bonaparte's indication of San Pedro, Oaxaca, as the type locality until proven otherwise.

Webster (1958) was perhaps the first to give an ambivalent statement of the type locality: 'San Pedro, Oaxaca, or Chiapas, near Tabasco border.' Phillips (1966), when describing a new subspecies, *P. t. georgei*, said the adult male was 'similar to *P. t. taeniatus* (DuBus), 1847: Mexique' = 'Tabasco' (*i.e.* Jitotol, Chiapas, or a bit north); cf. Rovirosa, 1889', apparently introducing a new statement of the origin of Du Bus's type specimen based on the itinerary of Auguste Ghiesbreght, the collector of the type specimen.

Lowery & Monroe (1968: 78) mentioned the locality designations by Brodkorb (1944) and Zimmer (1948a), but not that of Phillips (1966). AOU (1983: 532) accepted Brodkorb's designation of San Cristóbal, Chiapas, without comment. Binford (1989: 344) agreed with AOU (1983), indicating that the type locality of *Peucedramus taeniatus* was in Chiapas rather than Oaxaca.

Phillips (1991: 10) equated Mexique of Du Bus to 'NEn [Northeastern] Oaxaca?' He further stated (p. 11) that 'Although most of Ghiesbreght's collecting was done in Tabasco and Chiapas, examination of the type he collected indicates the need of comparison with NEn Oaxaca birds, as above.' This statement, in effect, reflects Zimmer (1948a).

Finally, Lowther & Nocedal (1997) noted the two possible type localities of Brodkorb and Zimmer, as given by Lowery & Monroe (1968), and analysed the possible taxonomic scenarios that might result from one or the other type localities being accepted, dependant on how much morphological variation is recognised, stating again that 'Review of the type and additional material from this region is again necessary.' Once again, this suggests that if the type can be identified to a recognisable population, the type locality can be fixed to within the range of that population. This ignores the fact that the badly faded type has been of no taxonomic value since at least the 1940s.

According to Rovirosa (1891), the Belgian collector Auguste Ghiesbreght traveled to Tabasco in 1839. He and his companions worked actively in Tabasco, especially in the vicinity of Teapa, and in the mountains of Chiapas until March 1840 and amassed significant collections. There is no indication in Rovirosa's (1891) account of Ghiesbreght's activities that he was in or near Oaxaca in that period. Several years later, after 1855, he did work at or near Jitotol, Chiapas, the locality mentioned by Phillips (1966), but that was well after the description of *Peucedramus taeniatus*.

It seems certain that the type specimens of both *Cyanocorax unicolor* and *Sylvia taeniata* described by DuBus (1847), collected by Ghiesbreght in 'Tabasco,' must have come from the nearby mountains of Chiapas, as already stated by van Rossem (1942) and Brodkorb (1944). The type localities as restricted by Brodkorb (1944) to San Cristóbal, Chiapas, must stand, although perhaps better stated as San Cristóbal de las Casas, Chiapas, as presently indicated on many maps.

Thus, the nominate subspecies, *Peucedramus t. taeniatus* includes the birds of the mountains of Chiapas, Mexico, and Guatemala, and *P. t. aurantiacus* Ridgway, 1896, is a synonym. The western population, in Guerrero and Oaxaca, Mexico, is *P. t. georgei* Phillips, 1966.

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Remarks concerning the all-black coastal boubous (*Laniarius* spp.) of Kenya and southern Somalia

by Donald A. Turner, Brian W. Finch & Nigel D. Hunter

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Following the recommendation of Nguembock *et al.* (2008) that three races of the Tropical Boubou complex be treated specifically, namely *Laniarius* (*aethiopicus*) *major*, *L.* (*a.*) *sublacteus* and *L.* (*a.*) *erlangeri*, attention is now drawn to the taxonomic position of the all-black boubous occurring from the Tana Delta, Kenya, north to the Juba and Shabeelle valleys in southern Somalia, which most authorities have treated as rare black morphs of *L.* (*a.*) *sublacteus* and *L.* (*a.*) *erlangeri* (White 1962, Ash & Miskell 1998, Fry *et al.* 2000). With no all-black birds sampled in the Nguembock *et al.* (2008) study, the possibility of a major re-appraisal in our understanding of these coastal boubous has been missed.

On 15 July 1878 Gustav Fischer collected an all-black boubou at Kipini (Tana Delta) which Reichenow (1879) named *Dryoscopus nigerrimus*. In 1905, Reichenow named two further boubous, from the collections of Baron von Erlanger, both from the Juba Valley in southern Somalia. An all-black specimen was named *Laniarius erlangeri*, whilst a more typical black-and-white bird was named *Laniarius aethiopicus somalicusis*.

Van Someren (1922: 116, 1932: 307), after comparing topotypes of Reichenow's two described forms (*erlangeri* and *somalicusis*) with his own material from Kipini, Manda, Lamu and Juba, seriously questioned the validity of *erlangeri* and *nigerrimus*. Grant & Mackworth-Praed (1944), making no mention of any all-black birds, recognised *L. ferrugineus somalicusis* and *L. f. sublacteus* as the two coastal forms of Tropical Boubou, and Stresemann (1947) having examined *nigerrimus* argued it was just a morph of the sympatric black-and-white *L. f. sublacteus*, despite that van Someren (1922) considered that his specimens from Lamu exhibited intermediate features. Subsequently, White (1962), Ash & Miskell (1998), Fry *et al.* (2000) and Dickinson (2003) also recognised *L. aethiopicus sublacteus* and *L. a. erlangeri* as the two East African coastal boubous, although White (1962) failed to mention either *nigerrimus*

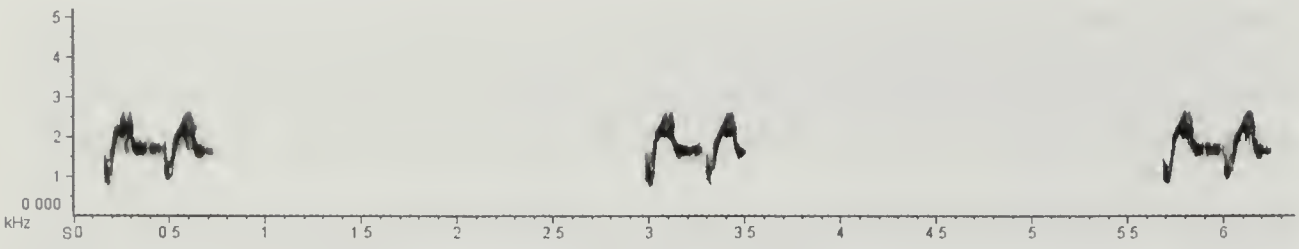

Figure 1. Sonogram of the explosive two-noted call produced by the all-black boubou, recorded on Manda Island, Lamu District, Kenya, on 25 April 2010, by Brian W. Finch, using a Sony TCM 200DV recorder and Sennheiser directional microphone. Sonogram created using Raven Lite 1.0 for Windows, and background subsequently cleaned in Photoshop.

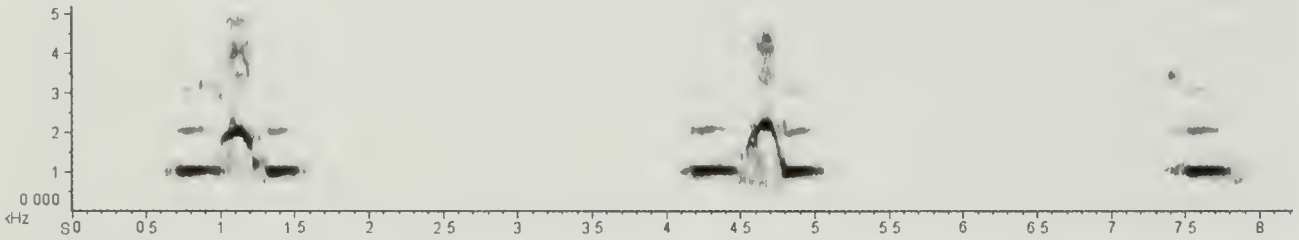

Figure 2. Sonogram of the three-noted 'bell-like' calls of the coastal Tropical Boubou *Laniarius aethiopicus sublacteus*, recorded on Manda Island, Lamu District, Kenya, on 25 April 2010, by Brian W. Finch, using a Sony TCM 200DV recorder and Sennheiser directional microphone. Sonogram created using Raven Lite 1.0 for Windows, and background subsequently cleaned in Photoshop.

or *somaliensis*. Mackworth-Praed & Grant (1955) had treated *nigerrimus* as a black morph of *L. f. sublacteus* and *somaliensis* as a synonym of *L. f. erlangeri*.

Recent sound-recordings from Manda Island, Lamu District, north-east Kenya, have revealed that glossy all-black birds occurring alongside typical black-and-white Tropical Boubous (*L. a. sublacteus*) possess a vastly different vocal repertoire, making them surely worthy of more critical examination and comparison with old specimens of *Laniarius nigerrimus* and *L. erlangeri*. Four different calls were recorded, three of which were loud, ringing and explosive with an almost 'gonolek-like' quality to them, and totally unlike either Slate-coloured Boubou *Laniarius funebris* or any form of Tropical Boubou *L. aethiopicus*, as follows. Firstly, a repeated loud *wee-ooo* delivered from a high exposed perch at a rate of slightly more than one per second. Secondly, a loud double *weeerk-weeerk* also from a high exposed perch, lasting little more than a second, but spaced by a slightly longer interval (Fig. 1). Thirdly, a throaty four-note *jhi-jhi-jhi-jhi* lasting little more than a second with a *c.*1 second pause between each set of calls. The female would join the male in a duet with a throaty soft *churr* commencing almost simultaneously with the male's *wee-ooo* call, and lasting fractionally longer. The term 'gonolek-type' is used to indicate a certain similarity between the calls of all-black birds and the two species of gonolek in western Kenya (Black-headed Gonolek *Laniarius erythrogaster* and Papyrus Gonolek *L. mufumbiri*), both of which are noted for their loud explosive calls from deep cover.

Fourteen playback experiments were performed, and playback of calls of the coastal *L. a. sublacteus* taken *in situ* only attracted identical pairs of other black-and-white *L. a. sublacteus*, while the all-black birds exhibited no response. Similarly, playback of calls of the all-black birds would immediately attract identical pairs of other all-black birds, but were ignored by black-and-white *L. a. sublacteus*. However, when we interchanged the calls of each of the two all-black pairs, the results were dramatic, with each becoming highly vocal and aggressive.

The parachute display of the all-black male birds, with deep wingbeats, fully fanned tail and raised mantle feathers, reminded BWF of a similar display-flight of Sooty Boubou *L.*

leucorhynchus that he has witnessed several times in the Mabira Forest of southern Uganda, whilst the churring notes of the female in duet, together with the males' use of high exposed perches from which to vocalise further reminded BWF of Red-naped Bushshrike *L. ruficeps*. Although there are no recordings of any southern Somalia birds, J. Miskell (pers. comm.) noted that in 1979 when travelling in the Shabeelle Valley with J. Mwaki, an experienced field observer and technician from the National Museums of Kenya, Mwaki commented that the call of an all-black boubou had a distinct 'gonolek-type' quality to it, rather than the bell-like quality of Tropical Boubou calls he was familiar with in Kenya. Similarly, throughout their recent stay on Manda Island, BWF & NDH were equally struck by the loud, ringing, explosive calls of all-black birds as opposed to the three-noted 'bell-like' calls of *L. a. sublacteus* (Fig. 2).

Given that all earlier authorities have treated the all-black boubous on Manda Island as a dark morph of the coastal Tropical Boubou *L. a. sublacteus*, consideration must also be given to Slate-coloured Boubou. The last-named species, with which we are all very familiar, inhabits dry to semi-arid scrub, and while it was not encountered on either Manda or Lamu islands, it does occur in dry scrub on the adjacent mainland, especially at Kipini in the Tana Delta, where Fischer originally collected *nigerrimus*. Throughout its range, Slate-coloured Boubou is immediately recognised by its diagnostic *tonk-tonk-coco-wheet* call. Furthermore, its dull matt black and grey plumage is strikingly different to the glossy black with violet / green iridescence of the Manda birds. Similarly, the single specimen of *nigerrimus* in Berlin and the five all-black specimens in Nairobi are obviously glossy black and easily distinguishable from any Slate-coloured Boubou.

The all-black Manda birds occupy tall scrubby woodland, i.e. a much 'richer' habitat than that preferred by Slate-coloured Boubou, which shuns forests of all types and on the coast is restricted to dense low semi-arid *Croton* thickets. That three boubous, one all glossy black, one matt black and grey, and one black and white, have been recorded within a relatively small area of coastal East Africa from the Shabeelle and Juba valleys in southern Somalia south to Manda and Kipini in north-east Kenya is remarkable. Should these all-black boubous be deemed worthy of a higher taxonomic status (which the vocal evidence from Manda suggests), rather than merely races of Tropical Boubou, the nomenclature of East African birds will require revision. (1) The all-black birds may revert to *Laniarius nigerrimus*, while (2) the black-and-white birds in southern Somalia would revert to *L. aethiopicus somaliensis*, as the taxonomic status of *erlangeri* as defined by Nguembock *et al.* (2008) would require re-evaluation because that name was originally employed by Reichenow for an all-black bird.

We hope that any future critical re-examination of these coastal boubous will include samples of the all-black birds. It is abundantly clear that a thorough molecular and vocal study of all relevant populations of these confusing coastal boubous is urgently needed.

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First documented records of Pearly-breasted Cuckoo *Coccyzus euleri* for French Guiana, and an overlooked specimen from Ecuador

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Of the eight *Coccyzus* cuckoos resident in or visitors to continental South America, Pearly-breasted Cuckoo *C. euleri* is one of the rarest and least known. Although it is reported across most of South America east of the Andes, the species' breeding range is poorly known (Payne 1997). Breeding has been reported in northern Argentina, in Paraguay, in southern and eastern Brazil, and as far north as Roraima in northern Brazil (Payne 1997, 2005). The latter is based on a female (FMNH 343751) collected in October with an ovary measuring 14 × 10 mm, two exploded follicles and an enlarged oviduct. Northern Brazil lies far from other known breeding areas and, although a migrant could possess developed gonads prior to reaching its breeding grounds, these data prove breeding (S. W. Cardiff, M. A. Echeverry-Galvis, A. Jones, J. V. Remsen, D. Willard *in litt.* 2010). Elsewhere, Pearly-breasted Cuckoos are probably only austral migrants, as suggested by dates and the paucity of records.

Only two records are known in Bolivia, both from dpto. Santa Cruz (Vidoz *et al.* 2010). Two specimens and a presumed sight record are available from Esmeraldas, Pichincha and Napo provinces in northern Ecuador (Ridgely & Greenfield 2001; R. S. Ridgely *in litt.* 2008). The species has been reported from just two localities in northern and eastern Colombia (Hilty & Brown 1986). Pearly-breasted Cuckoo is uncommon and irregular in Venezuela, where the species has been reported in the Distrito Federal and from Isla Margarita, Mérida, Amazonas, Apure and Bolívar, but its status in the country is unclear (Hilty 2003, Payne 2005). A vagrant collected on Sombrero Island, the northernmost of the Lesser Antilles, is the only validated record for North America (Banks 1988, AOU 1998). Two claims in central

Panama, in June 2007 and June 2009 (Anon. 2009a, 2009b), were rejected by the Panama Records Committee (D. Montañez & G. Berguido *in litt.* 2010).

However, records outside the species' usual range should be treated cautiously, due to the risk of confusion with Yellow-billed Cuckoo *C. americanus*, and the species may be overlooked for the same reason. Moreover, poor descriptions in field guides and the relative lack of available photographs of *C. euleri* do not facilitate its identification by observers unfamiliar with it, making the species' true range difficult to divine.

Pearly-breasted Cuckoo is a rare austral migrant to the Guianas. In Guyana, it is scarce in lowland forests (Braun *et al.* 2007), while in Surinam the species is known from three specimens collected on the coastal plain in Para district, one on 28 August 1905 and two on 20 September 1964 (Ottema *et al.* 2009). Until recently, there was no proof of its occurrence in French Guiana. Tostain *et al.* (1992) mentioned one in riparian swamp forest by the Counama River on 26 July 1990, but the species was subsequently removed from the country's bird list due to lack of evidence (Claessens & Renaudier in prep.). Here we describe the first confirmed records in French Guiana. Simultaneously, a check of the bird collection of the Museum National d'Histoire Naturelle, Paris (MNHN) revealed a misidentified specimen of *C. euleri* from Ecuador, which is the only specimen of this species at MNHN.

First records in French Guiana

On 9 August 2009, TD photographed a *Coccyzus* cuckoo in the canopy of a *Sterculia* (Malvaceae) tree at Saut Pararé on the Arataye River, in Nouragues Nature Reserve, in central west French Guiana (04°02'N, 52°41'W). The bird was present for *c.*2 minutes on the same perch before disappearing. Unfortunately, TD did not see the bird in flight, so was unable to attest to the presence or absence of any rufous in the primaries. However, the photograph (Fig. 1) shows the slim and elongated body, long tail held closed and in line with the back, and long, pointed, somewhat drooping wings; bicoloured, pointed and slightly hooked bill, the mandible yellow with a black tip and the maxilla mainly black; grey (not yellow) eye-ring; uniform brown upperparts, including the head, mantle and uppertail; pale grey breast with no salmon tinge, and whitish undertail-coverts; no mask around the eye and no grey line on the cheeks; and no rufous in the primaries.

Among *Coccyzus* potential in the region, only *C. americanus* and *C. euleri* exhibit a combination of bicoloured bill and whitish or greyish underparts. The pearl grey instead of whitish breast, grey not yellow eye-ring, and lack of rufous in the primaries are usually considered key features to distinguish *euleri* from *americanus* (Hilty 2003, Restall *et al.* 2006). However, none of these characters is absolute. *C. americanus* with a grey eye-ring are not rare; most are first-years, but a few adults lack the yellow eye-ring typical of the species (Payne 2005). The colour of the underparts varies in *americanus* from pure white to pale grey, and any shadow can make them appear darker, making this character difficult to judge in the field. Furthermore, the extent of rufous in the wings is highly variable. On some specimens at MNHN it is restricted to the inner web of the primaries, making the rufous hardly visible on the closed wing. However, the colour is usually obvious, even when perched and should have been visible on the drooping wings of the French Guiana bird, if present. In any case, a combination of these three characters in *C. americanus* would be highly unlikely.

Date, habitat and locality reinforce the identification as *C. euleri*. All 21 records of *C. americanus* in French Guiana have been in mid September to late May (GEPOG 2010, Renaudier *et al.* 2010, Claessens & Renaudier in prep.). In Surinam, the 24 published records are in October–November and late March–early June (Ottema *et al.* 2009). Early August would be very early for *C. americanus* in French Guiana, but a normal date for an austral

migrant like *C. euleri*. Furthermore, *C. americanus* regularly occurs in semi-open and bushy habitats in coastal French Guiana. There is just one, recent, record, on 21 April 2010, by L. Epelboin *et al.*, in forest, in the Montagne de Kaw in north-east French Guiana, i.e. near the coastal plain. There was an unusual influx of the species into French Guiana during spring 2010 (data from Comité d'Homologation de Guyane), which might explain this observation away from 'typical' habitat. *C. americanus* is an uncommon visitor to Amazonian Brazil, where it occurs in *várzea* and open habitats (Stotz *et al.* 1992; M. Cohn-Haft *in litt.* 2009). In contrast, *C. euleri* is a regular migrant to Amazonian Brazil and a canopy-dwelling species, favouring primary *terra firme* (M. Cohn-Haft *in litt.* 2009). An observation in the canopy of primary forest in French Guiana conforms much more to *euleri* than *americanus*.

The French Guiana Rarities Committee (CHG) has accepted the record as the first confirmed record of *C. euleri* in the country. Subsequently, on 15–17 September 2010, AR observed and tape-recorded at least seven cuckoos at two sites *c.*20 km apart between Roura (04°43'N, 52°19'W) and Regina (04°18'N, 52°08'W), in north-east French Guiana, including five at one site. Both sites were in forest *c.*45 km inland and comprised a primary forest edge along a road and a low (25 m tall) dense secondary forest, respectively, both adjacent to the primary forest that covers the interior of French Guiana. All of the birds were in the canopy, sometimes just a few hundred metres apart. One cuckoo sang spontaneously, another emitted a rattling call. All responded to playback of a recording of the song of *C. euleri* (XC6036, from Brazil, by C. Albano; www.xeno-canto.org) by singing or calling instantly and repeatedly. Recordings made by AR are also deposited at www.xeno-canto.org (XC72105–109). One bird flew over the observer in response to playback, but the others did not approach and even moved away while calling or singing. Songs and rattling calls were similar to those of *C. euleri* on www.xeno-canto.org. Visual observation was difficult. However, those birds which were seen were rather small *Coccyzus* with a noticeably slim body, large white terminal spots on the underside of the long tail, brownish upperparts, a black mask, a black bill with a yellow mandible, all-whitish underparts and no rufous in the wings. However, these records were validated by the CHG based on the following: (1) location well inside forest, and habitat, i.e. canopy; (2) the large number of birds involved on a date very early for migrant *C. americanus*, but consistent with the occurrence of *C. euleri*; (3) the lack of any other records of *C. americanus* during the same period (there was none during the entire autumn migration); (4) the birds' strong reaction to playback of the song of *C. euleri*; and (5) intense vocal activity which is more likely in *C. euleri* pre-breeding than for *C. americanus* during autumn migration. Voice and plumage characters reinforced the identification of these birds as *C. euleri*.

Overlooked specimen from Ecuador

While checking the bird collection at the Museum National d'Histoire Naturelle, Paris (MNHN), OC examined *Coccyzus* specimens looking for specific distinctive characters and variation. The collection contained no *C. euleri* but 30 *C. americanus* from North America, the Antilles and northern South America. One (MNHN 1937-76; Fig. 2) from Ecuador and labelled '*Coccyzus americanus*? subsp.' instead showed characters consistent with *C. euleri*. Its wings had no trace of any rufous in the primaries, even on their inner webs. *C. americanus* usually shows prominent rufous in the wings (Hilty 2003, Restall 2006), which becomes paler over the primary- and greater coverts. However, in a few individuals (e.g. MNHN 1922-51) the rufous is restricted to the inner webs of the primaries and is hardly visible in the closed wing. It is, however, always present and conspicuous in the open wing, e.g. in flight. Narrow and inconspicuous rufous fringes to the greater primary-coverts of MNHN 1937-76 might indicate a juvenile despite the annotation '♂ *ad.*' in the Catalogue

Figure 1. Pearly-breasted Cuckoo *Coccyzus euleri*, Saut Pararé, Nouragues Nature Reserve, French Guiana, 9 August 2009 (Tanguy Deville / ECOBIOS)

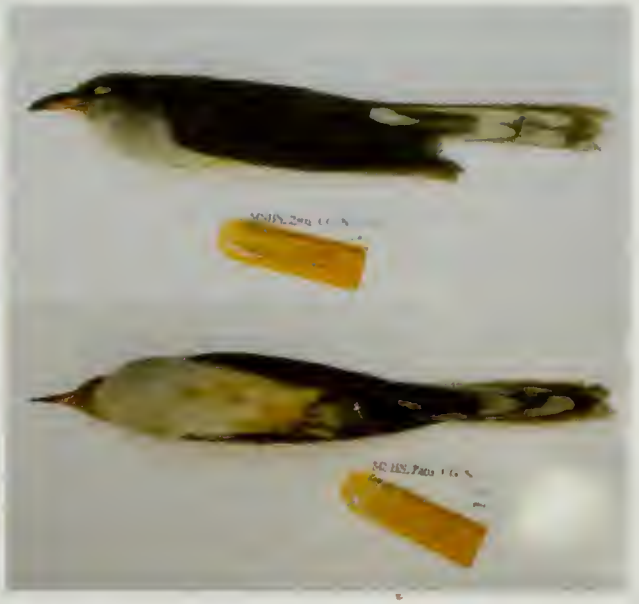

Figure 2. Pearly-breasted Cuckoo *Coccyzus euleri*, specimen MNHN 1937-76 from north-west Ecuador, Collection Mammifères et Oiseaux, Muséum National d'Histoire Naturelle, Paris (Olivier Claessens)

Général. In any case, this is not a specific character of *americanus*, as in *C. americanus* this colour is never restricted to the covert fringes but extends mainly over the inner webs of the primaries becoming paler on the outer webs and the wing-coverts. Its breast was greyer than that of *americanus* specimens, which difference was slight but obvious. The breast colour in *euleri* is not always as dark as in some photographs or illustrations (M. Cohn-Haft *in litt.* 2009) making this character the least useful for identifying *C. euleri*. Nonetheless, a bird with a contrasting grey breast is probably this species, and in combination with other characters strongly points to *C. euleri* (M. Cohn-Haft *in litt.* 2009). MNHN 1937-76 is slightly but obviously smaller than most *americanus* specimens, with a noticeably slimmer body, although size and shape in specimens greatly depends on preparation techniques, making this an unreliable character. Measurements were as follows: wing 136 mm (chord) / 137 mm (stretched), tail 120 mm, bill depth 7.6 mm, bill length 18.5 mm (nostrils to tip), 21.3 mm (feathers to tip) and 27.5 mm (skull to tip). Wing length is longer than the range given by Banks (1988) and at the upper limit given by Payne (2005) for *C. euleri*.

The bicoloured bill is shared by both species, and eye-ring colour could not be judged. Ridgely & Greenfield (2001) mention that the latter is not a reliable character, which point merits further investigation. The tail feathers showed pronounced wear and were typical of a juvenile *Coccyzus* (Payne 2005). They were noticeably narrower and more pointed than those of *C. americanus* specimens examined, possibly all of which were adults; the undertail was duller than that of *americanus*, and the large pale terminal spots, which were narrower and elongate, appeared also duller and less 'neat'. The bird had extensive ochraceous on the belly, but this is due to the persistence of fat in the poorly prepared skin (K. Voisin pers. comm.).

This combination of characters identifies the specimen as a Pearly-breasted Cuckoo, which becomes the only *C. euleri* specimen held at MNHN and only the fourth published record for Ecuador.

The Catalogue Général at MNHN contains the following details regarding this specimen and the circumstances of its collection (translated): 'Collection of birds from Ecuador (Esmeralda area), bought from Mr Olalla, naturalist at Quito. *Coccyzus americanus*

(L.)? subsp. Adult male'. It was registered together with 170 other specimens probably collected in north-west Ecuador, such as Pallid Dove *Leptotila pallida*, Bronze-winged Parrot *Pionus chalcopterus*, Black-cheeked Woodpecker *Melanerpes pucherani*, Scarlet-backed Woodpecker *Veniliornis callonotus*, Red-rumped Woodpecker *V. kirkii cecilii*, Guayaquil Woodpecker *Campephilus gayaquilensis* and Lineated Woodpecker *Dryocopus lineatus fuscipennis*. In Ecuador, *C. euleri* was known from two specimens, singles taken in prov. Esmeraldas (held at the Academy of Natural Sciences Philadelphia, ANSP 185132) and at Mindo, prov. Pichincha (now in the Mejía collection, Quito), and a sight record at Jatun Sacha, prov. Napo (Ridgely & Greenfield 2001; R. S. Ridgely *in litt.* 2008). The *C. euleri* specimen at MNHN thus constitutes an additional record for north-west Ecuador. The label states that it was collected at San Mateo, Esmeraldas, on 30 September 1936, indicating that the bird was taken pre-breeding. San Mateo (00°58'S, 80°50'W) is a coastal village south-west of Manta, in central Manabí (Paynter 1993).

The specimen's label makes no mention of age and the indication 'adult' in the Catalogue Général is erroneous, as the shape and colour of the tail feathers, and the dull tail spots, indicate that the bird is a juvenile (Pyle 1997, Payne 2005), as might also the rufous fringes to the primary-coverts. Sex was presumably deducted from a gonadal inspection, as there are no plumage differences between the sexes.

Berlioz (1937) reported an 'immature' male *C. a. americanus* collected at San Mateo, Esmeraldas, on 30 September 1936. He noticed 'obvious traces of immaturity on tail fathers' together with the 'total absence of rufous tinge on the underwing and on flight feathers', which he interpreted as being indicative of an immature. Although Berlioz did not mention the specimen's number, we are confident that he was referring to MNHN 1937-76, because its measurements, description, locality, date and collector ('a well-known professional collector from Quito') perfectly fit this specimen. It seems unsurprising that both its collector Olalla and Berlioz misidentified it as *C. americanus*, considering the rarity of *C. euleri* in Ecuador and the poor knowledge of the species' identification and taxonomy at that time.

The taxonomic status of *C. euleri* has long been controversial, complicated by its synonymy with *Coccyzus julieni* Lawrence, 1864. The latter, described from a Sombrero Island specimen, was often considered a subspecies of *C. americanus* (e.g., by Cory 1919). Although some earlier authors (e.g. Peters 1940) recognised South American *euleri* as specifically distinct from *americanus*, the '*euleri* / *julieni* / *americanus* complex' remained diversely treated until Banks (1988) showed that *euleri* and *julieni* were synonyms and should be treated as a species apart from *americanus*. The name *euleri* was then definitively established against *julieni* (ICZN 1992). The history of this case was synthesised by Willis & Oniki (1990). Thus, the label of the MNHN specimen '*Coccyzus americanus* (L.)? subsp.' also reflects the uncertain taxonomy of the time.

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First documented record of Sharp-billed Canastero *Asthenes pyrrholeuca* in Brazil

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Sharp-billed Canastero *Asthenes pyrrholeuca* breeds principally in Argentina, with smaller populations in Chile, Bolivia, Paraguay and Uruguay (Ridgely & Tudor 1994). Two subspecies are recognised. *A. p. sordida* breeds in central-south Chile and central-east Argentina. It is considered partially resident with unknown numbers migrating north in the austral winter, when it reaches northern and north-west Argentina, and southern Bolivia. *A. p. pyrrholeuca* breeds in central-south Argentina with some birds reaching northern and north-east Argentina as well as southern Paraguay (Hayes *et al.* 1994, Remsen 2003, Di Giacomo 2005). In Brazil, it was first recorded in extreme south-west Rio Grande do Sul state, near the border with Argentina (Uruguaiana), on 31 May 2001, in marshy habitat, and at the Uruguayan border (Quaraí), on 9 May 2005, in dry tall grasses among *Acacia caven* trees (Bencke *et al.* 2002, Repenning & Fontana 2007; Fig. 1). However, because of the lack of documentation in both cases, the species resides on the secondary list of Brazilian birds (CBRO 2009).

Figure 1. Map showing all known records of Sharp-billed Canastero *Asthenes pyrrholeuca* from Brazil: (1) Near the rio Uruguay, Uruguaiana municipality (29°55'S, 57°18'W), (2) Areal district, Quaraí municipality (30°25'S, 56°23'W) and (3) São Gabriel municipality (30°18'S, 54°24'W).

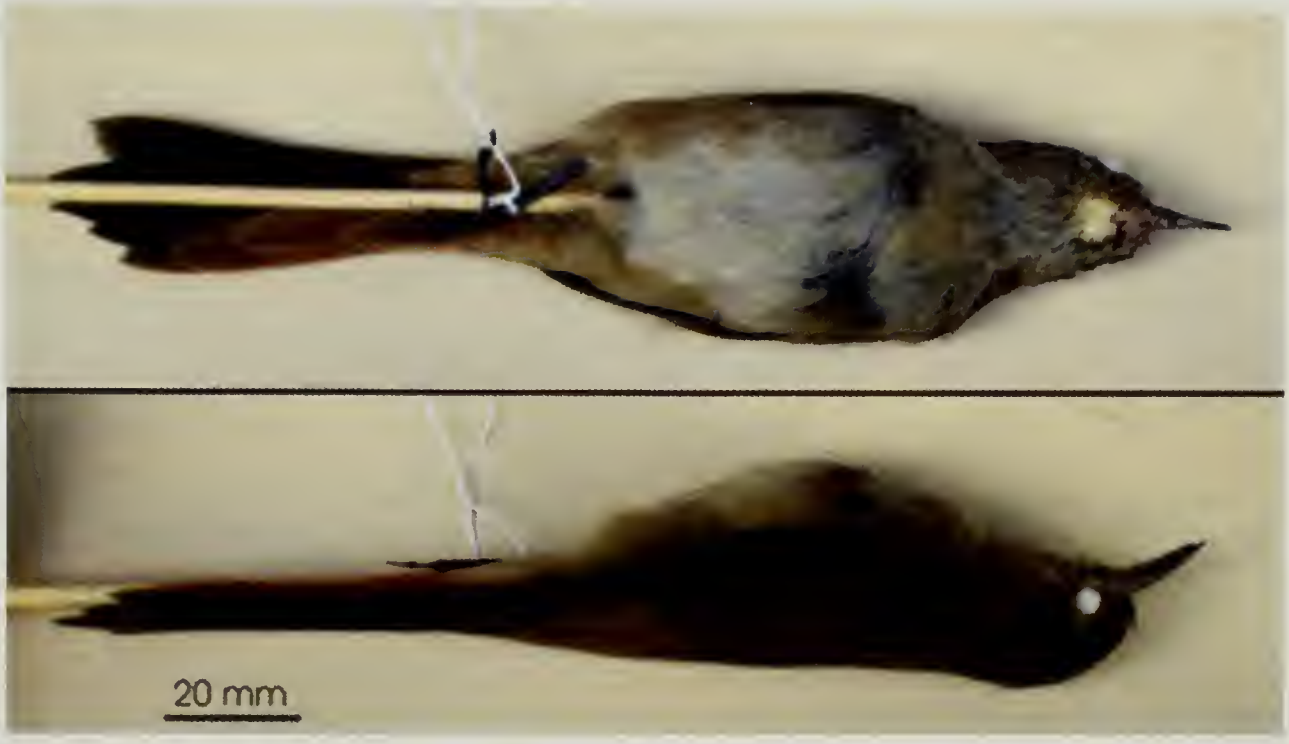

Figure 2. Ventral and lateral views of adult male Sharp-billed Canastero *Asthenes p. pyrrholeuca* (MCP 2804) found dead in São Gabriel municipality, Rio Grande do Sul, Brazil, on 9 March 2010 (Márcio Repenning)

We conducted observations on road-killed birds over 4 km of the BR-290, in May 2009–May 2010, in São Gabriel municipality in the centre-west of Rio Grande do Sul (Fig. 1). Natural vegetation in the area is a mosaic of grassland and scrub (Teixeira *et al.* 1986, Leite & Klein 1990). In the morning of 29 May 2009, a freshly dead bird was found at km 427 (30°18'S, 54°24'W). The bird probably collided with a car when flying across the road, suggesting that it was perhaps foraging in the surrounding grassland and marshy vegetation with low and sparse bushes.

The specimen was sent to the Laboratory of Ornithology at the Museu de Ciências e Tecnologia, Pontifícia Universidade Católica do Rio Grande do Sul (PUCRS), and was identified as *A. p. pyrrholeuca* (*sensu* Vaurie *et al.* 1980, Remsen 2003) based on the dark brown upperparts. It was prepared as a specimen and deposited in the collection of the same institution (MCP 2804). It was a male: testes (left) 2.0 × 1.0 mm and (right) 1.5 × 1.0 mm, weight 12.1 g, total length 162 mm, culmen length 13.80 mm and tail length 84 mm. Soft parts colours: bill Sepia with base of mandible Light Drab and tarsus Blackish Neutral Gray (Smithe 1975) (Fig. 2). These features and measurements distinguished the specimen from Short-billed Canastero *Asthenes baeri*, which is known to breed in Rio Grande do Sul (Remsen 2003).

This record and the previous two Brazilian observations (Bencke *et al.* 2002, Repenning & Fontana 2007) confirm that *A. p. pyrrholeuca* does migrate north (Palerm 1971, Remsen 2003), even as far as Brazil. Our May specimen confirms the hypothesis that the species is present in southern Brazil in autumn (Repenning & Fontana 2007). This first Brazilian specimen means that the species can be added to the primary list of Brazilian birds and is probably a winter visitor to far southern Brazil.

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